Promoting low-carbon lifestyles: addressing informational needs through small-group participation

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Abstract

Achieving the carbon emission reductions necessary to address climate change is proving challenging. Voluntary behaviour change by individuals has the potential to make a substantial contribution to decreasing carbon emissions, but generally that potential is not being realised. Group-based interventions, however, may offer an effective method for promoting significant and durable changes in pro-environmental behaviour leading to carbon reductions. This thesis evaluates Footpaths, a group-based programme designed and implemented by Transition Leicester and consisting of seven sessions. The study investigates the effectiveness of the programme, using a longitudinal mixed-methods approach to facilitate understanding of both measurable results and the processes leading to those results. The Reasonable Person Model (RPM) is used as a theoretical framework to aid understanding of the way in which group-based interventions may promote pro-environmental behaviour.

Data were collected from participants just before and immediately after involvement with the Footpaths programme, as well as a year after the sessions commenced. Questionnaires were administered at all three times and semi-structured interviews were conducted after the last session. Participants also completed a carbon footprint calculator at all three times and provided data on measured energy use.

Findings show that Footpaths participants reduced their carbon footprints by 15 percent over the course of the sessions, and continued to reduce their carbon footprints resulting in a 20 percent reduction over the course of a year. Pro-environmental behaviour increased, including increases in harder to change behaviours, and measured energy use decreased. Increases in pro-environmental behaviour and reductions in carbon footprint were associated with increased understanding, greater feelings of competence, and reduced confusion; all considered to be elements of a supportive informational environment. Participants highlighted the importance of having an opportunity to examine their own behaviour coupled with active engagement with information over a period of time. Neither feedback nor a desire for social contact were related to increases in pro-environmental behaviour. Pro-environmental behaviour was more closely associated with both worldview and attitude after participation in Footpaths possibly indicating a closer alignment between attitude and behaviour after participation.

This research suggests that group-based interventions are effective in promoting significant and durable changes in pro-environmental behaviour and it provides interesting insight into the design of successful interventions to encourage such behaviour. Findings highlight the potential value of the RPM as an integrative framework for understanding the characteristics of interventions that successfully promote durable sustainable behaviours.

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Chapter 1: Introduction

1.1 Background to study

Over twenty years ago the United Nations noted in Agenda 21 that "the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries" (United Nations Division for Sustainable Development, 1992). It has become increasingly clear since then that this unsustainable production and consumption is driving growth in anthropogenic greenhouse gas emissions. The 4th Assessment report of the Intergovernmental Panel on Climate Change highlighted the growing threat of climate change resulting from these emissions (Intergovernmental Panel on Climate Change, 2008). If the most serious impacts of climate change are to be avoided it is essential that action is taken now to reduce greenhouse gas emissions. In response to this issue the government of the United Kingdom (UK) passed the Climate Change Act in 2008 which sets legally binding targets for reductions in UK emissions. The Act commits the UK to an 80% reduction in greenhouse gas emissions by 2050 compared to 1990 levels, with an intermediate reduction target of 34% by 2020 (HM Government, 2009).

If these deep cuts in emissions are to be achieved, all sectors of the economy will need to contribute. The UK government has a number of policy options for achieving the required reductions including encouraging individuals to modify their behaviour. Changes in individual behaviour have been seen as important to achieving reduction targets as direct use of energy by the domestic sector (including home energy and personal transport) accounts for approximately 50% of UK greenhouse gas emissions. There are also further emissions from the domestic sector related to food, waste and water use (DEFRA, 2009). Successive UK governments have therefore included actions by individuals as part of their carbon reduction strategies.

The UK government has attempted to reduce emissions from the domestic sector through monetary support for renewable energy generation and for energy efficiency programmes, through taxation and levies on fossil fuels, and through communication campaigns to influence individual behaviour (HM Government, 2005). The importance accorded to voluntary behaviour change in reducing energy use and carbon emissions was reflected by the social marketing strategy based on detailed market segmentation

which was adopted by the Department of the Environment, Food and Rural Affairs in 2009 (DEFRA, 2009). This strategy also underpinned the government information programme Act on CO_2 which was launched by DEFRA in 2007.

With the change in government in 2010, however, there has been a move away from campaigns which seek to engage the public in voluntary behaviour change towards technological and economic strategies such as the Green Deal (Smith, 2010). This new programme enables private companies to market energy efficiency improvements to home owners which are then paid back through savings in energy bills. The UK Carbon Plan (HM Government, n.d.) emphasises changing individual behaviour in the home through technological interventions such as smart metering which is expected to reduce energy consumption through making energy use more visible. Emissions reductions from transport are expected to come primarily from the adoption of low-emission vehicles, although there is some public engagement being funded around travel choices. The Carbon Plan makes little mention of engaging the public in voluntary behaviour change even though the UK Energy Research Centre estimates that changes in individual and household behaviour could contribute a 30 percent cut in emissions on 1990 levels (Spence and Pidgeon, 2009). Such a reduction in emissions could make a substantial contribution towards the carbon savings needed from households to meet the 2020 target.

1.2 The challenge of voluntary behaviour change

If voluntary change in individual and household behaviour does have the potential to reduce individual and household emissions by 30 percent then further research to understand how to encourage this scale of change is clearly important. Indications from the literature are that voluntary behaviour change programmes are not currently delivering the scale of reductions which are theoretically possible (Abrahamse, Steg, Vlek, and Rothengatter, 2005; Haq, Whitelegg, Cinderby, and Owen, 2008; Jackson, 2005). This does not seem to be the result of a lack of acceptance among UK residents that climate change is happening (Lorenzoni, Nicholson-Cole, and Whitmarsh, 2007; Thornton, 2009) or of a lack of understanding that it is caused by human actions including energy use (Ockwell, Whitmarsh, and O'Neill, 2009; Thornton, 2009). However a number of psychological, social, economic and physical barriers to

increasing pro-environmental behaviour have been identified (Whitmarsh and O'Neill, 2010). People are often uncertain about what actions to take, or they are unaware of the comparative impact of different actions leading to a mis-match between behaviour motivated by environmental concern and the importance of the behaviour to environmental impact (Whitmarsh, 2009). Furthermore, some of the energy savings resulting from technological changes are being lost through the rebound effect, where theoretical energy savings are reduced through increased energy use (Saunders, 2013; Sorrell and Dimitropoulos, 2008).

Although there is evidence that the attitude of the UK public has become more pro-environmental (Thornton, 2009), there remains a gap between attitude and behaviour resulting in limited success in promoting actual changes in behaviour (Barr, 2004; Kennedy, Beckley, McFarlane, and Nadeau, 2009; Kollmuss and Agyeman, 2002). For example, a recent review of thirty-eight interventions targeting household energy use found either no reduction in energy use or a reduction of less than 5% in the majority of the interventions (Abrahamse *et al.*, 2005). This scale of reduction is inadequate if the domestic sector is to contribute its share to the necessary reductions in carbon emissions. Durability of change was also an issue in the interventions examined in this review. Thirteen of the thirty-eight studies considered long term effects of the interventions (reductions still in effect after two or more months) and only five of those reported that reductions were maintained (ibid). Haq *et al.*(2008) found a similar problem with changing transportation behaviour in York, a city in the north of England. Although they document significant changes six months after the intervention, there was a return to original behaviours after twelve months.

A further concern is that many programmes designed to promote pro-environmental behaviour focus on a specific behaviour or attitude without attempting to influence related behaviours or overall lifestyle (Spence and Pidgeon, 2009). Even when these interventions have resulted in significant changes in the targeted behaviour there is little evidence of impact on other pro-environmental behaviours (Thøgersen and Ölander, 2003). Nevertheless focusing on specific behaviours in isolation or small groups of related behaviours continues to be the standard approach to promoting pro-environmental behaviour (McKenzie-Mohr, 2000; Steg and Vlek, 2009). This concentration on single behaviours may be inappropriate given evidence which suggests

that groups of pro-environmental behaviours co-vary (Barr, Gilg, and Ford, 2005; Kaiser, Byrka, and Hartig, 2010). Indeed there is some evidence that concentrating on a single behaviour can be counter-productive as people focus their pro-environmental intentions on that behaviour rather than on behaviours that may have greater environmental impact (Stern, 2000; Whitmarsh, 2009). The moral licensing effect is also a potential difficulty with interventions targeting single behaviours or small groups of related behaviours. Moral licensing occurs where increases in one area of pro-environmental behaviour are accompanied by decreases in other areas, for example where decreases in water use as a result of a water conservation campaign were accompanied by increases in electricity use (Tiefenbeck, Staake, Roth, and Sachs, 2013).

1.3 The potential of group-based interventions

If voluntary increases in pro-environmental behaviour are to make a substantial contribution to reducing energy use and carbon emissions in the UK, it is important that programmes promoting pro-environmental behaviour deliver both significant and durable change, and target a range of pro-environmental behaviour. Given the limited success of behaviour change initiatives attempting to promote pro-environmental behaviour there is an urgent need to understand how such behaviour can be encouraged. One approach to improving the outcome of such interventions is to consider the most effective interventions in detail, to identify the elements of those interventions related to their effectiveness, and to examine the processes underlying those elements. The review by Abrahamse *et al.*(2005) of interventions aimed at reducing household energy use does indicate that there are some intervention types which are more successful than others. Of the interventions examined in that review, the only one which showed a significant and durable reduction in energy use was the EcoTeams programme in the Netherlands. EcoTeams is one of an increasing number of programmes which use a group-based approach and target collections of behaviours or lifestyles (Fisher and Irvine, 2010; Hargreaves, Nye, and Burgess, 2008; Howell, 2009; Howell, 2012; Lockwood and Platt, 2009; Nye and Burgess, 2008; Staats, Harland, and Wilke, 2004). These programmes bring together small groups of people to jointly consider a range of behaviours and attitudes in a study group format similar to those used in health care

contexts (Jansson, Almberg, Grafstrom, and Winblad, 1998; Landtblom, Lang, and Flensner, 2008). Participants in these group-based interventions are reported to achieve significant and durable reductions in energy use and carbon emissions, but it has been suggested that more research is needed to understand the processes underlying the success of these groups (Hargreaves *et al.*, 2008; Staats *et al.*, 2004). If it is possible to understand both which elements within the groups are associated with their effectiveness, and what processes underlie those elements, then there is a potential for integrating these elements and processes into other types of interventions aimed at promoting pro-environmental behaviour.

Approaches using group discussion have been shown to promote behaviour change, from the pioneering work of Lewin (1952) on the acceptance of unusual meats through to more recent work by Werner and others on the use of toxic products (Werner, Sansone, and Brown, 2008; Werner and Stanley, 2011). Group-based programmes have also been used to promote pro-environmental behaviour change at the neighbourhood level (Haq and Owen, 2009). The effectiveness of the group-based programmes may relate to the nature of the people who choose to participate in them, to the nature of group-based activities, or to the nature of the group process. Social learning (Bandura, 1977) and normative influence (Cialdini, 2003) have both been demonstrated to be important to behaviour change and both operate within group settings. However, there may be underlying processes which are not dependent on the group setting or the particular nature of the people who participate in group-based interventions. If these processes can be identified then it may be possible to integrate these in the design of interventions targeting a wider audience. This study explores whether such processes can be identified by conducting an in-depth case study of Footpaths, a group-based intervention devised and implemented by members of Transition Leicester within and around the city of Leicester in the United Kingdom. The Footpaths programme is described in detail in Chapter 3.

1.4 Research aims and objectives

This thesis attempts to improve understanding of group-based interventions which promote pro-environmental behaviour change in the hopes of identifying the elements within interventions which are associated with their effectiveness, and identifying the

processes underlying those elements. The overall aim of this study is to examine how group-based interventions may facilitate significant and durable increases in pro-environmental behaviour. Such an understanding might help inform the development of successful, non group-based pro-environmental behaviour change programmes

This research aim is explored through a number of objectives which include:

1. To evaluate the extent to which participants in group-based interventions increase their pro-environmental behaviour and reduce their energy use and carbon emissions.
2. To assess the durability of any changes in pro-environmental behaviour and reductions in energy use and carbon emissions associated with group-based interventions.
3. To explore which elements of the group-based interventions are associated with pro-environmental behaviour change.
4. To develop an understanding of the processes underlying the elements in group-based interventions which are associated with pro-environmental behaviour change.

1.5 Thesis structure

This thesis has 7 chapters. The chapters following this introduction are summarised below.

Chapter 2: A review of group-based interventions promoting pro-environmental behaviour

This chapter reviews published material on group-based interventions which promote pro-environmental behaviour change. It includes an evaluation of the effectiveness of these interventions and presents the rationale for the theoretical framework used in this study. It also presents the specific research questions to be addressed.

Chapter 3: Research Setting and Study Design

This chapter presents the overall research methodology used to attempt to answer the research questions. It also provides information about the Footpaths programme and outlines the overall data collection strategy.

Chapter 4: Quantitative Study

This chapter describes the quantitative part of the study and presents the specific methods used, the results obtained, and a discussion of the results.

Chapter 5: Qualitative Study

This chapter outlines the qualitative part of the study, details the methods used and the results obtained, and presents a discussion of the results.

Chapter 6: Participant Level Analysis of Qualitative and Quantitative Data

This chapter explores the relationships between quantitative and qualitative findings across a sub-set of participants for whom full data sets were available.

Chapter 7: Discussion and Conclusions

This chapter summarises the key findings from this research, and relates them to previous research as well as to the research objectives. Implications for practitioners and policy makers are outlined. Limitations of the research are discussed and areas for further research are identified.

Chapter 2: A review of group-based interventions promoting pro-environmental behaviour

2.1 Introduction

There are a multitude of behaviour change initiatives promoting pro-environmental behaviour change, all with differing degrees of effectiveness (Jackson, 2005; Steg and Vlek, 2009). This review focuses solely on the group-based interventions that appear to be effective at promoting significant and durable changes in pro-environmental behaviour (Abrahamse *et al.*, 2005; Fisher and Irvine, 2010). The effectiveness of a number of these interventions is considered, common elements within the interventions are identified, and previous suggestions about the processes underlying these elements are reviewed.

2.2 Literature review method

A review of literature about group-based interventions which promote pro-environmental behaviour was conducted to identify studies which presented changes in behaviour quantified either by energy use or carbon emissions. The inclusion of this quantifiable information as a selection criterion was important to allow for an objective evaluation of the effectiveness of the programmes based on measured changes in energy use and carbon emissions. Pre-defined keywords were used to search a variety of databases, and bibliographies of texts identified in searches were examined for further information. Citation searches were also conducted for literature identified through keyword searches. In total, published sources containing quantified information on energy use and/or carbon emissions were found for only four group-based interventions targeting pro-environmental behaviour. These published sources included both peer reviewed journal articles and reports. Due to the paucity of peer reviewed literature about the effectiveness of these interventions, information from both peer reviewed papers and project reports was included in the analysis. Published qualitative data were also available for three of these interventions, in the form of quotations from participants and reflections on participants' experience of the groups.

The four interventions are described briefly below and their effectiveness in promoting pro-environmental behaviour change is assessed using De Young's five dimensions for

evaluating behaviour change interventions: reliability, speed of change, particularism, durability, and generality (De Young, 1993). Previous explanations for the success of the interventions are also considered.

2.3 Effectiveness of group-based interventions

This section provides a description of how each of the group-based interventions functioned followed by an evaluation of the effectiveness of the groups in reducing energy use and carbon emissions.

2.3.1 Description of Interventions

All four group-based interventions discussed here had elements in common. The groups

- consisted of six to ten people
- met regularly
- had access to reliable information through written material and/or access to a trained "expert"
- provided an opportunity for participants to explore the information with others
- addressed collections of behaviours with the stated purpose of reducing the environmental impact of the participants' lifestyles
- were usually drawn from a neighbourhood, a workplace or a community of interest such as a faith group or a voluntary group

United Kingdom EcoTeams

The longest established and largest of the programmes considered here is EcoTeams which is run by Global Action Plan (GAP) both in the UK (Global Action Plan, 2008; Nye and Burgess, 2008), and internationally (Staats and Harland, 1995; Staats *et al.*, 2004). UK EcoTeams met once a month for five months with set monthly topics. Meetings were facilitated either by GAP employees (fully-facilitated), or by trained volunteers (semi-facilitated). Participants were provided with information packs and workbooks, and encouraged to explore, discuss and share information. The facilitator had access to further information and advice from GAP (Global Action Plan, 2008). Participants monitored reductions through weighing rubbish and recording electricity and gas use. This information was sent to GAP UK which provided personalised reports

showing any changes. Changes in electricity and gas use were adjusted for external temperature to allow comparison across time.

The UK EcoTeams programme has been assessed both by GAP UK through questionnaires and measurement of energy, waste and water use (Global Action Plan, 2006) , and by Nye and Burgess (2008) in a DEFRA-commissioned evaluation focusing on energy use and waste reduction. By 2008 a total of 3,602 UK households had participated in EcoTeams and household consumption data were available for 1,096 households (Global Action Plan, 2008).

EcoTeams in the Netherlands

EcoTeams in the Netherlands met once a month for eight months with a set monthly topic (Staats, *et al.*, 2004). Dutch EcoTeams were provided with information packs and workbooks, and had access either to a trained facilitator or someone at a support centre. Exploration, discussion and sharing of information were encouraged. Participants weighed waste and took gas and electric meter readings to monitor reductions. They recorded these in an individual logbook and submitted this information to GAP who provided feedback about the reductions made by the group (Staats and Harland, 1995). The Dutch EcoTeams programme has been extensively assessed in a longitudinal study of 153 households through questionnaires and measurement of energy, waste and water use (Staats and Harland, 1995; Staats *et al.*, 2004).

Carbon Rationing/Reduction Groups

The third group-based intervention is the Carbon Reduction/Rationing Action Group (CRAG) (Howell, 2009; Howell, 2012; Seyfang, Lorenzoni, and Nye, 2007). The CRAG movement is a loosely knit community of people who meet together in groups to identify ways to reduce their carbon emissions. Unlike EcoTeams, there is no specific model for how CRAGs function, although Ross (2006) provides suggestions. Howell (2009, 2012) analysed information about energy use and carbon reductions posted to the CRAG web site from five different CRAG groups and documented the carbon reductions reported by the 50 participants. Members of CRAGs agreed how to record changes in energy use and emissions, recorded their own electricity and gas meter and vehicle odometer readings, and shared information at regular meetings (Howell 2009,

2012). Individual CRAGs chose how often to meet (often monthly) and participants reported in interview that they valued the opportunity to discuss changes and share ideas (Howell, 2009). CRAGs recorded their energy use and carbon emissions on an annual basis and had no trained facilitators, but groups were supported by information on the CRAG web site (CRAG, 2006-7).

Green Streets

A slightly different group-based intervention was conducted by British Gas as part of its Green Streets programme (Lockwood and Platt, 2009). In this programme eight households were recruited in each of eight streets to form neighbourhood teams with the intention of reducing the emissions of all the households in the team. The team that made the largest reductions won a cash prize. Green Streets households had access to a dedicated energy advisor who provided information and expert advice and answered queries (Lockwood and Platt 2009). The teams met to discuss and share information. British Gas also provided each group with £30,000 of funding to make improvements to their homes, including a mandatory element of renewable energy generation. Green Streets participants were provided with feedback through real-time hand-held meters which continuously displayed electricity consumption, and monitoring of energy consumption through monthly electricity and gas meter readings.

2.3.2 Evaluation

De Young (1993) proposed a framework for assessing behaviour change interventions which attempts to provide a method for considering the overall effectiveness of the interventions across a number of criteria. This framework consists of five dimensions: reliability, speed of change, particularism, durability and generality. This framework provides a standard method for assessing behaviour change interventions and allows the strengths and weaknesses of intervention types to be identified and hopefully addressed. The performance of the four programmes identified in the literature search for each of these dimensions is considered below.

Reliability

The first dimension for evaluating behaviour change interventions is reliability which measures how successful a technique is at instigating behaviour change (De Young

1993). Published evaluations of the four group-based interventions considered here showed average reductions in energy use and carbon emissions of approximately 20% within a year, ranging from 17% to 27% (Howell, 2009; Lockwood and Platt, 2009; Nye and Burgess, 2008; Staats *et al.*, 2004). Table 2.1 summarises the reductions achieved by the four programmes considered here.

Table 2.1 Previously published reductions in energy use, carbon emissions, waste and water use for group-based interventions

Programme	Number of participants	Percent reduction		Percent carbon reduction	Data collection
UK EcoTeams[1]	1096	Electricity Gas Water Waste	7 21 15 20	17	Meter readings and weights reported by participants
Netherlands EcoTeams[2]	153	Electricity Gas Water Waste	7 23 5 30	Unreported	Meter readings and weights reported by participants
CRAGs[3]	50	Unreported		27	Meter readings reported by participants
Green Streets[4]	64	Energy	25	23	Meter readings collected by British Gas

[1] Nye and Burgess, 2008, [2] Staats *et al.*, 2004, [3] Howell, 2009, [4] Lockwood and Platt, 2009

It is worth noting that the total reduction in carbon emissions for the UK EcoTeams may be higher than that reported here as savings in transport emissions were not recorded. Although reductions were not quantified for that programme participants did make changes to their transport use by reducing short car trips (under 2 miles), increasing their use of public transport, and planning to buy more fuel-efficient cars (Nye and Burgess, 2008). Carbon reductions for Dutch EcoTeams may also be higher than

reported here for similar reasons. Although reductions in carbon emissions associated with transport for EcoTeams in the Netherlands were not recorded, Staats *et al.* (2004) demonstrate a significant change in travel mode choice for journeys of less than 5 km after participation in the Dutch EcoTeams programme.

It is also worth noting that although some of the reduction in energy use and carbon emissions in the Green Streets programme is attributable to improvements facilitated by the funding provided by British Gas, Lockwood and Platt (2009) emphasize the important role behaviour change played in the project, with about 50% of the energy savings being attributable to behaviour change rather than to installed measures. They also note that there was considerable variation in energy use between households which was directly attributable to differences in behaviour. The Green Streets programme did not address transport emissions.

The reductions in energy use, water use, carbon emissions and waste production found in the interventions are a result of changes in a collection of related behaviours. Staats *et al.*(2004) report significant changes in 19 out of 38 measured behaviours after participation in the Dutch EcoTeams and a significant number of UK EcoTeams members adopted at least 22 new pro-environmental behaviours as a result of participation (Global Action Plan, 2008). Interviews with participants in Green Streets also indicated that the households adopted at least 13 pro-environmental behaviours as a result of participation (Lockwood and Platt 2009).

Overall it appears that the group-based interventions considered here were successful at promoting pro-environmental behaviour leading to significant reductions in energy use and carbon emissions.

Speed of change

All the interventions reviewed here achieved results within one year. Studies of the UK EcoTeams demonstrated results after 5 months, the Dutch EcoTeams after 9 months, and the CRAGs and Green Streets after one year. The actual rate of change is not documented in published sources as studies of the programmes compared information from the start and end of the interventions without presenting intermediate results.

Particularism

The particularism dimension relates to how widely an intervention could be applied (De Young 1993). One fundamental difference between participants in these interventions and the general population is that the participants join the programmes with the intention of learning about changing their behaviour. In addition, participants in group-based interventions are usually environmentally aware and are already involved in some pro-environmental behaviours (Nye and Burgess 2008; Howell 2009, 2011; Staats and Harland 2004). In the Netherlands, participants in EcoTeams were asked eight specific questions about pro-environmental behaviour before participating in the groups, and their responses were compared with responses from a representative sample of the Dutch population who were part of a longitudinal study of environmental household behaviour. The EcoTeams participants were found to behave in a more pro-environmental way than 80% of the Dutch population (Staats *et al.*, 2004).

In the UK EcoTeams the majority of participants interviewed as part of a longitudinal study were also involved in pro-environmental behaviours before joining EcoTeams (Nye and Burgess 2008). These interviewees had all participated in the fully-facilitated model where the group was directly recruited by EcoTeams and was facilitated by a member of GAP staff. None of the interviewees had participated in the semi-facilitated model because it was instituted more recently. In the semi-facilitated model the facilitator is a volunteer, recruited and trained by GAP. Participants in this model are usually drawn from the facilitator's existing social networks, rather than recruited directly by GAP. GAP suggests that people who choose to become directly involved with an environmental organisation such as GAP are more likely to already be involved in pro-environmental behaviours than those who are recruited by a friend or colleague. This suggestion is supported by the comparison of volunteer facilitators with team members in the semi-facilitated model which indicated that team members at the start of the programme displayed fewer pro-environmental behaviours than team leaders (Global Action Plan, 2008). It seems possible, therefore, that the semi-facilitated model may be successful at reaching segments of the population less involved in environmental issues (Global Action Plan, 2008).

Participants in CRAGs had carbon emissions that were approximately 5% lower than the UK average at the start of the CRAG, possibly reflecting involvement with pro-environmental behaviour before joining a CRAG (Howell 2012).

Green Street participants were drawn from eight different cities, and from a variety of housing types reflecting the proportions found nationally (Lockwood and Platt 2009). The average carbon footprint of participants at the beginning of the study was slightly higher than the UK average and interviews with a sample of participants indicated that there were a variety of attitudes to the environment and to energy use. Interviews suggest that at least part of the motivation for becoming involved was the money provided by British Gas for improvements and the prospect of winning a prize.

Evidence from the programmes considered here suggests that group-based interventions may be best suited to those with prior green intentions, and are not therefore widely applicable. However, evidence about participants in the semi-facilitated EcoTeams model in the UK may suggest that this type of intervention can be applied more widely with training of volunteer facilitators from a wider variety of contexts (Global Action Plan, 2008). Also the Green Street participants did not start with specifically pro-environmental attitudes, but the funding from British Gas may have encouraged people to get involved with the programme.

Durability and Generality

Two issues identified in discussions related to behaviour change are the permanence of changes resulting from interventions, and the likelihood of changes in a single behaviour leading to changes in other environmentally significant behaviours (Abrahamse, *et al.*, 2005; Haq, *et al.*, 2008; Thøgersen and Ölander, 2003). De Young (1993) refers to these as durability and generality, with generality also including the likelihood of individuals encouraging others to change their behaviour. In follow-up studies with 151 participants who had completed EcoTeams in the UK two to three years before, over 90% stated that they had not only maintained the lifestyle changes they had made, but were also doing more to reduce their environmental impact (Global Action Plan, 2008; Nye and Burgess, 2008).

In the Netherlands a follow-up study of EcoTeams households six to nine months after completion of the programme showed further significant increases in pro-environmental

behaviour. Two years after completion the increases in pro-environmental behaviour were maintained or improved upon (Staats et *al.* 2004). These participants were compared with a sample matched for pro-environmental behaviours from a representative household survey on environmental behaviour conducted annually in the Netherlands. Eight pro-environmental behaviours were assessed to identify whether the improvement in pro-environmental behaviour might be attributable to participation in the EcoTeams programme. During the first year there was a statistically significant increase in the pro-environmental behaviour of EcoTeams participants compared to that of the comparison group, although the behaviour of the comparison group improved slightly. Over the following two years the pro-environmental behaviour of the EcoTeams participants continued to increase, while that of the comparison group showed no change (Staats *et al.*2004).

No follow-up information was available for CRAGs or for Green Streets, although Lockwood and Platt (2009) report anecdotal evidence that some people living in the participating streets who were not part of the Green Street team were motivated to reduce their energy use and carbon emissions. Also, at least one of the Green Street teams held community meetings to share their experience and advice with people who had not been involved in the intervention.

Overall, where information is available, it seems that the group-based interventions considered here promote lasting change, and that group-based interventions have the potential both to encourage further pro-environmental behaviour in participating individuals and to inspire these individuals to encourage others to adopt changes.

2.3.3 Discussion

The evidence presented above demonstrates that group-based interventions promote significant and durable pro-environmental behaviour change of the scale needed to begin to address UK carbon emission targets. These interventions appear to act quickly and participants make substantial and lasting changes to their pro-environmental behaviour and reduce their energy use and carbon emissions. The increase in pro-environmental behaviour occurring after the end of the interventions suggests that these interventions also encourage the continuing adoption of new pro-environmental behaviours. There is also some evidence that participants encourage others to adopt

more pro-environmental behaviour. For the four dimensions of speed, reliability, durability and generality, therefore, these interventions appear to be successful (De Young 1993). Evidence from considering the particularism dimension, however, suggests that group-based interventions might not be successful if applied widely as participants in these interventions seem either to have existing pro-environmental beliefs or to have been motivated by a financial incentive. There is a question, therefore, about whether the success of these interventions is related to the type of participant or whether there are mechanisms and processes underlying the elements within this intervention type which are related to their effectiveness.

2.4 Group-based interventions – previous explanations for success

The review of group-based interventions above indicates that they have significant potential for promoting pro-environmental behaviour, at least for particular groups of people. Explanations for this success have been suggested by Staats *et al.*(2004) for the Dutch EcoTeams, Burgess, Hargreaves, and Nye (Hargreaves, *et al.*, 2008; Nye and Burgess, 2008) for UK EcoTeams, and Howell (2009, 2012) for Carbon Rationing Action Groups. These explanations are reviewed for each of the interventions considered here with the hope of identifying common themes which may be related to the effectiveness of group-based interventions in promoting pro-environmental behaviour change.

EcoTeams in the Netherlands

Staats *et al.*(2004) suggest that three elements, originally proposed by De Young (1996) as important for successful behaviour change interventions, were central to the success of the Dutch EcoTeams. These elements are: detailed information about how to make changes, feedback about the effect of the changes, and social support. Staats *et al.* (2004) suggest that as well as providing practical advice, information can increase awareness of a problem and also awareness of what others are doing, thereby providing not only procedural knowledge but also increasing the incentive to act. They suggest that feedback may increase self-efficacy beliefs as participants are able to see that the changes they make to their behaviour do make a difference to the environmental impact of their lives. They also suggest that feedback may activate personal and social norms by raising awareness of the environmental impact of a participant's behaviour and by

allowing comparison with the behaviour of others in a measured way. The importance of a supportive social setting in facilitating change was documented as early as the 1940s in Lewin's (1952) work on promoting the cooking and eating of less common meats through discussion groups and has been confirmed by subsequent studies (Werner and Stanley, 2011). Staats *et al.*(2004) suggest that social support is important because of the influence of social interaction on personal and social norms and through the importance of public commitments to subsequent behaviour (Cialdini, 2003).

Staats *et al.*(2004) explore the possibility that behaviours addressed by the EcoTeams programme are largely habitual behaviours and that one explanation for the success of EcoTeams in promoting pro-environmental behaviour is that it makes behaviour more reasoned as opposed to habitual. Staats *et al.*(2004) suggest, therefore, that information, feedback, and social influence are important because they increase reasoned behaviour which increases the intention to perform pro-environmental behaviours, and help to overcome the effect of habit.

Staats *et al.*(2004) examine one environmentally significant behaviour, travel, in detail, in an attempt to understand the relationship between participation in EcoTeams and pro-environmental behaviour. Specifically, they looked at choosing a non-car transport mode for short journeys (less than five kilometres) using the constructs from the Theory of Planned Behaviour (Ajzen, 1991). They assumed that transport choice would be more reasoned, and therefore more actively considered and less habitual among participants who reported greater involvement with, or influence from, participation in EcoTeams. They hypothesised that intention would become a stronger predictor of behaviour change, and habit a weaker predictor, as travel choice was more actively considered. Involvement with, or influence from, participation was measured by reported social influence, reported appreciation of the workbook (as a measure of information), and reported appreciation of the feedback supplied by EcoTeams. Looking at the relationship between behaviour change and these three measures, only social influence showed a statistically significant correlation with behaviour change. Regression analysis using social influence as a measure of participation showed that behaviour change was not predicted by intention, habit or social influence independently. However, when two and three-way interactions were added to the regression analysis the prediction of behaviour change significantly improved. Staats *et*

al.(2004) conclude that behaviour change is better predicted by intention when social influence is higher, regardless of habit. When social influence was lower, intention predicted behaviour only when habits were weak. Staats *et al.*(2004) note that this relationship may only hold true for this one behaviour, travel mode. Furthermore, their measure of social influence was derived from three questions which included questions both on the impact of social learning and on social pressure to conform. This results in a lack of clarity about which construct was being measured as the importance of learning from others can be seen as information provision rather than more general social influence.

EcoTeams in the UK

Nye and Burgess (2008), in an evaluation of the UK EcoTeams programme conducted for DEFRA, adopt an approach based on a lifestyles and social practices analysis of pro-environmental behaviour. Their analysis of the effect of participating in EcoTeams is based on qualitative data from focus groups and interviews. They suggest that environmentally significant behaviour is a result of the practices of everyday life and not of reasoned action. Following Giddens' Structuration Theory (Nye and Burgess 2008), they suggest that everyday routines are controlled by 'practical' consciousness. This practical consciousness relates to habitual, unreasoned behaviour. Reasons for carrying out routines in a particular way are part of 'discursive' consciousness which relates to reasoned behaviour. They see pro-environmental behaviour as an interaction between the individual acting out of both practical and discursive consciousnesses and the context - both physical and social - within which they are operating. Nye and Burgess (2008) suggest that EcoTeams is effective because of two basic elements, group meetings and feedback. Group meetings are important both for social support and for diffusion of information. Results from qualitative analysis of interview data suggest that there were several aspects of the group setting which were important in promoting pro-environmental behaviour change. These were social support for making changes, social pressure for making changes, information about local facilities, and information from the facilitator and EcoTeams literature. In addition they propose that the personalised feedback provided by measuring energy use and waste were important in providing feelings of intrinsic satisfaction. They suggest that this intrinsic satisfaction

was based on increased competence and control, and increasing awareness of waste production and energy use.

Nye and Burgess (2008) attribute the durability of behaviour change in EcoTeams participants to the ability of integrated sets of routines to be mutually supporting, and to the desire of participants to maintain their self-identity. They point out that behaviours do not occur in isolation, but are attached to other behaviours and to a social and physical context.

Hargreaves, Nye and Burgess (2008) identify the same three elements as those identified by Staats *et al.*(2004) - measurement and feedback, information, and supportive social interaction - as being crucial to the effectiveness of the EcoTeams programme. They argue that these three elements "enable individuals to safely expose their taken-for-granted routines and behaviours to reflexive scrutiny in a trusted community of peers or colleagues" (p. 743). Hargreaves *et al.*(2008), however, emphasise the critical importance of both the discussion element of the groups and the opportunity to experiment with specific practical action to the success of the programme. They suggest that feedback provides intrinsic satisfaction, due to increased feelings of self-efficacy and competence (De Young, 2000) which result from the ability of feedback to demonstrate the link between changes in behaviour and reductions in waste, and water and energy use. They suggest that the feedback in EcoTeams is particularly effective in the context of group discussion because it allows participants to expose their behaviours to reflexive scrutiny in comparison with others in the group, and in the context of wider environmental issues. The opportunity to experiment with specific practical action reflects the importance of the small experiment framework described by Irvine and Kaplan (2001) which allows individuals to try out behaviours in a supportive environment.

When discussing the informational aspect of UK EcoTeams, Hargreaves *et al.*(2008) suggest that the programme helps to generate three distinct types of knowledge: knowledge of wider environmental issues, knowledge of local environmental issues and facilities, (including knowledge of possible household level changes), and finally knowledge of personal environmental impact as a result of the feedback process. They contrast the difference between the exchange and discussion of local and personal

information about change in EcoTeams with the top-down provision of information in most environmental behaviour change interventions. “Rather than making assumptions about what behaviours people perform and how they should be changed, the group discussions start from what group members actually do, how they make sense of it to themselves, and what changes they think are realistic” (Hargreaves *et al.*, 2008, p.753). They see EcoTeams as forums where social learning can take place.

Nye and Burgess (2008) suggest that the “most readily apparent cognitive motivation [in EcoTeams] is to ‘try out’ new green activities, or to perform old activities in greener ways” (p.81). They identify what they consider to be two important points related to how participation in EcoTeams changes how people think. In understanding the cognitive outputs of the programme they suggest that more cognitive effort is required by pro-environmental decisions that are outside everyday routines, that greater cognitive effort is required to break existing routines than in adopting new routines which fit in with an existing lifestyle, and that trustworthy information is essential to pro-environmental behaviour change. They suggest that EcoTeams provide different kinds of knowledge, particularly procedural information which is locally based. Overall they state that EcoTeams “encourage a process of ‘joined up thinking’ about the environmental impacts of a lifestyle and the routines within it” (p.84).

More information about reasons for the effectiveness of EcoTeams is provided by results from questionnaires of participants carried out by Global Action Plan at the end of EcoTeams sessions (Global Action Plan, 2008). When asked what factors were important in helping them to reduce their environmental impact, 55% of the participants rated the following factors as very important:

> *Made me feel more strongly that environmental action is my personal responsibility, not someone else’s (70%)*
>
> *Given me practical advice on what I can do to reduce my impact (63%)*
>
> *Made me believe that what I do actually makes a difference to the environment (58%)*
>
> *Made me more confident I can actually do the things that are needed to reduce my impact (55%)*

These clearly reflect the importance of self-efficacy and competence, elements which Hargreaves *et al.*(2008) attribute to the intrinsic satisfaction gained from feedback. However, the importance given by participants to practical advice indicates that the information provided by the EcoTeams is also important. Social factors such as "*Helped me to meet other people like me who are trying to reduce environmental impact in their everyday lives"* and *"Persuaded me that being 'green' is normal"* were considered less important at 43% and 32% respectively. Interestingly only 38% of participants rated *"Shown me what personal benefits I can get from reducing my environmental impact"* as very important, suggesting that extrinsic motivation was not as strong as intrinsic motivation in the participants (Nye and Burgess, 2008 p. 117)

Carbon Rationing/Reduction Action Groups (CRAGs)

Howell (2009, 2012) explored the effect of being in a small group on participants in CRAGs through qualitative analysis of interviews. She found that 'moral support' was one of the two advantages of being in a group mentioned most often by participants. Quotes included in her report suggest that this 'moral support' is the result of feeling part of something bigger and of being respected for what you are doing. The other advantage mentioned most frequently was the potential for sharing information, particularly practical information and information about local facilities. Social pressure to do what they committed to was mentioned by about a quarter of participants, as were the social aspects of the group. Interestingly only one CRAG which Howell studied failed to become established and that CRAG was the only one which did not have regular meetings. Howell (2009) suggests that regular meetings provided the opportunities for the moral support and information sharing identified by participants as important to their success in reducing energy use and carbon emissions. Without regular meetings participants did not have the opportunity for accessing this support. Howell (2009) suggests that CRAGs are successful because the 'moral support' of the group provides a context where reducing emissions is the social norm, and because participants were empowered to take control of their emissions, and could see how they could reduce them. She also highlights the importance of the information sharing between group members which provided an opportunity to learn from people with direct experience or from people who could provide locally relevant information.

2.4.2 Discussion

Previous explanations for the success of group-based interventions in promoting pro-environmental behaviour change identify a number of common elements. These are:

- the provision of information
- a supportive social context
- feedback on the effects of behaviour change on energy use and carbon emissions

The importance of the provision of information seems to be linked to the mechanisms of discussion or learning from others in evaluations of both UK EcoTeams (Hargreaves, *et al.*, 2008; Nye and Burgess, 2008) and CRAGs (Howell, 2009, 2012). These two mechanisms, discussion and learning from others, are not well differentiated in the discussion of UK EcoTeams or in the questions used by Staats *et al.*(2004) to measure social interaction which include the question: "Were you stimulated by your team members to take pro-environmental action in your household?" (Staats *et al.*, 2004). This question may relate to learning from others within the group or to the social support provided by participating in a group. Staats *et al.*(2004) use reaction to the EcoTeams handbook as a measure of the importance of information to EcoTeams participants. Given that discussion with others and learning from others were identified as the primary routes for acquiring information by participants in UK EcoTeams and CRAGs, it is possible that using reaction to written material as a measure of the importance of information may be misleading.

Feedback is both an element of the programmes and a mechanism which supports change according to both Staats *et al.*(2004) and Hargreaves *et al.*(2008). These authors suggest that feedback is an effective mechanism because it increases feelings of self-efficacy. Nye and Burgess (2008) suggest that feedback increases feelings of control and competence, and Hargreaves *et al.*(2008) also suggest that feedback may increase feelings of competence. None of these studies specifically measures changes in self-efficacy, control or competence, however. Staats *et al.*(2004) also suggest that feedback may trigger social and personal norms, but again there is no attempt to measure any normative effect of participation in Dutch EcoTeams.

2.5 Theoretical Framework

Three elements which appear to relate to increases in pro-environmental behaviour were identified in each of the group-based interventions reviewed here. Previous explanations for the success of these interventions focused on the fact that they provided a supportive context which allowed for re-examination of a wide range of behaviours. It was suggested that this supportive context is created by three elements: feedback, social support and engagement with information. With the exception of the investigation of a single travel-related behaviour among Dutch EcoTeams participants, however, these studies have not explored in depth the processes which underlie these elements (Staats *et al.*, 2004). This may be a result of the difficulty of applying standard behavioural models to interventions which attempt to influence multiple behaviours. Commonly used behaviour change models such as the Theory of Planned Behaviour (Ajzen, 1991) and the Value, Belief, Norm Theory (Stern, 2000) are not generally useful for predicting multiple behaviours (Jackson, 2005). Behaviour change programmes based on social marketing theory also tend to attempt to influence single behaviours or a small number of related behaviours (McKenzie-Mohr, 2000). Stern (2000) and others (Jackson, 2005) have pointed out that pro-environmental behaviour is very complex, with different determinants for different behaviours. Attempting to model each behaviour change in a group-based intervention would be an unwieldy task, and would fail to take into account interaction between the behaviours. Jackson (2005) points out the difficulty inherent in the "tension between parsimony and explanatory power" (Jackson, 2005, p.100) with simpler models explaining a relatively small proportion of variation in behaviour, and more complex models being very specific and difficult to operationalise. Bamberg (2013) has recently questioned the usefulness of the theoretical frameworks currently popular in environmental psychology, pointing out that these theories are not very successful in bridging the intention-behaviour gap and neglect important elements in interventions such as time and self-regulation.

2.5.1 The Reasonable Person Model (RPM)

There is, however, a recently developed framework, the Reasonable Person Model (RPM), which is conceptually suited to understanding group-based interventions (R. Kaplan and Kaplan, 2008; S. Kaplan and Kaplan, 1989; S. Kaplan, 2000; S. Kaplan and

Kaplan, 2003; S. Kaplan and Kaplan, 2009). Rather than looking at specific antecedents to behaviour, the RPM seeks to explain variation in human behaviour as a function of the environment - physical, social and cognitive - within which people operate.

De Young (2011) points out that the common approaches to promoting changes in pro-environmental behaviour attempt to manipulate people through the use of incentives, regulations, or through adjusting attitudes, knowledge or world-view. He suggests that there are three categories of psychological constructs that can be addressed to help change behaviour. The first category includes knowledge and attitudes and is extremely mutable, but the second two are more stable. The second category includes constructs such as personal norms, self-efficacy, and intrinsic satisfaction, and the third includes deep cognitive structures such as world-view. He suggests that durable behaviour change relies on changes in the second two categories and argues that those categories are less open to manipulation and rely more on people building their own understandings. The RPM outlines the properties needed in an environment which supports people in building and acting on their own understandings (Kaplan and Kaplan 2009).

Discussion of the effectiveness of the group-based interventions reviewed above suggests that the social and cognitive environment provided by the groups is important to their success. The RPM may provide a suitable framework for understanding the processes operating within the group-based interventions because the model is concerned with the effect of environment, broadly construed, on behaviour. Specifically the RPM links human behaviour with the ability of the environment to support human informational needs by proposing that environments which are supportive of human informational needs facilitate reasonable behaviour in people. Kaplan and Kaplan (2008) define reasonable behaviour as responsible, cooperative, and tolerant. They suggest that "environments which are easier to understand and interpret and which invite discovery of additional information are likely to be more congruent with people's needs. In other words, it would be adaptive for humans to prefer environments that facilitate their information processing activities" (Kaplan and Kaplan, 2009, p.330). They propose a close link between information and affect such that people have a strong preference for environments in which their informational needs are met, and are likely

to behave unreasonably in environments which are not supportive of these needs (Kaplan, 2000; Kaplan and Kaplan, 2009).

Kaplan and Kaplan (2009) suggest that environments which are supportive of human informational needs provide opportunities:

- to build and extend mental models
- to be clear-headed and effective
- to participate and feel needed

These opportunities may be provided by physical, social or cognitive environments, individually or in combination. By suggesting which aspects of the environment are important to information processing, and hence to reasonable behaviour, Kaplan and Kaplan (2009) provide a possible framework for understanding the effectiveness of group-based interventions in promoting pro-environmental behaviour. Thus it could be suggested that people will be willing to make significant changes to their behaviour if they have an opportunity to:

- explore the possibilities and increase their understanding (building models)
- be clear about the issues and feel competent in their abilities (being effective)
- believe that their efforts will make a difference and have possibilities for taking action (meaningful action)

The RPM therefore encompasses suggestions from previous studies that the processes underlying the effectiveness of group-based interventions include increasing knowledge, increasing self-efficacy beliefs, increasing competence, and increasing personal control (Hargreaves *et al.*, 2008; Howell, 2012; Nye and Burgess, 2008; Staats *et al.*, 2004).

To date only one study has attempted to operationalise the full RPM in the field of pro-environmental behaviour change. Corbett (2005) operationalised the model as self-interest, personal moral norm, and personal control based on an initial description of the RPM (Kaplan 2000). Although personal control relates to the competence element of the RPM, the other constructs used by Corbett do not appear to relate well to the RPM as described in more recent publications (Kaplan and Kaplan 2009). A second study

applied the RPM as a framework to aid understanding of why public involvement in ecological restoration projects is sometimes successful and sometimes not (Phalen, 2009). Phalen found that the RPM provided insights into why some projects are successful, but she used the RPM only as an interpretative framework without formally operationalising the constructs. In adopting the RPM in this study, therefore, it was be necessary to operationalise the RPM to measure changes in the constructs related to the three domains of model building, effectiveness and meaningful action. This operationalisation is described in detail in Chapter 4.

2.6 Research Questions

The literature review presented evidence that group-based interventions have been effective in promoting significant and durable pro-environmental behaviour change, and has suggested that the RPM is a particularly relevant framework for exploring processes underlying this effectiveness. Given the aim and objectives of this study and the results from this literature review a number of specific research questions were developed.

1. Do participants in a group-based intervention change their behaviour and reduce their carbon footprints after taking part in a group?
2. Are any increases in pro-environmental behaviour and reductions in carbon footprint and energy use durable?
3. Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?
4. Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased model building, feelings of effectiveness and belief in meaningful action?
5. What other elements of the environment provided by small, group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?

Chapter 3: Research Setting and Study Design

3.1 Introduction

The previous chapter provided an overview of the effectiveness of a number of group-based interventions which promoted pro-environmental behaviour. It considered previous explanations for the success of these interventions and suggested that the Reasonable Person Model (RPM) might provide a useful framework for understanding that success. Previous studies of these group-based interventions have suggested that more research is needed to understand the processes responsible for the effectiveness of the interventions (Hargreaves *et al.*, 2008; Staats *et al.*, 2004). An opportunity to conduct such research was presented by Footpaths, a group-based carbon reduction programme which was initiated in 2010 by Transition Leicester (Footpaths, 2013).

This chapter presents the overall research design for an evaluation of the Footpaths programme using the RPM as a theoretical framework to aid understanding of the elements in Footpaths related to pro-environmental behaviour and the processes underlying those elements. The chapter describes the Footpaths programme and then outlines the philosophical assumptions underlying the research. The overall research approach and the methodology chosen to explore the research questions identified in Chapter 2 are then presented. Details are provided about the overall data collection strategy, the Footpaths groups, and the participants included in this study. Full descriptions of quantitative and qualitative data collection and analysis are presented in Chapters 4 and 5.

3.2 Research Setting – The Footpaths Programme

Footpaths is a group-based carbon reduction programme developed and implemented by members of Transition Leicester (Footpaths, 2013). The Footpaths programme is designed specifically to help individuals reduce their carbon footprint in a supportive group environment. Each Footpaths group consists of six to ten people who meet regularly for seven sessions over three to six months (Figure 3.1). The first six sessions focus on a specific topic including climate change, home energy, water and waste, food, consumption, and transport. The final session provides an opportunity for reflection and celebration. Each of the first six sessions consists of a range of activities including

games, exercises, and opportunities for discussion and information sharing. Groups are facilitated by volunteers trained by the Footpaths project. In addition to the information and support provided in the meetings, participants are given a handbook which contains information about greenhouse gas emissions and other environmental impacts of everyday lifestyle choices. The handbook also contains suggestions for actions that can be taken to reduce these impacts and references to sources of further information. An outline of each session including details of the games and activities are included in the handbook so that participants are aware in advance of the content of the sessions.

Figure 3.1 A Footpaths group session

The Footpaths programme aims to help people reduce their carbon footprint by providing (Footpaths, 2013):

1. *A stimulating environment where we can share ideas creatively.*
2. *The chance to talk about things we love which may be lost through climate change.*
3. *A safe place where we can explore feelings.*
4. *The chance to choose for ourselves what changes we want to make.*
5. *Information about climate change, peak oil and carbon reduction.*
6. *The chance to work out what will make the most difference to our carbon footprints.*
7. *The support of other people and opportunities to support others.*

3.2.1 Relationship with the Footpaths project

The researcher approached members of Transition Leicester in January 2010 to suggest conducting an evaluation of the Footpaths project which was then being developed. The Footpaths organising group agreed in principle and a formal agreement was drawn up and signed in March 2010 (Appendix 1). The Footpaths organisers were happy to provide access to the groups with the understanding that they would have access to anonymised data and to interim results to inform further development of the programme. The researcher attended several meetings with the Footpaths organisers during the spring and summer of 2010 to develop an understanding of the Footpaths programme to inform the research design. The overall research design was discussed and agreed with the Footpaths organisers and all questionnaire and interview questions were approved by the organisers. A few questions were included in both the questionnaire and the interviews at the request of the Footpaths organisers. The questions are discussed in detail in the methods sections of the quantitative and qualitative studies (Chapters 4 and 5).

The researcher agreed to provide information to the Footpaths project during the course of the research and provide a final report at the end of the study. Various outputs have been generated during the course of the research including contributions to a grant application form including information on effectiveness, posters on interim results for use with sponsors and for publicity at events, and detailed information on pro-environmental behaviours and carbon footprints of participants.

The researcher also provided feedback directly to participants one year after the groups started in the form of personalised carbon footprint information for all participants who returned carbon footprint forms at the end of the group sessions. Participants were also sent copies of posters with interim results from the evaluation one year after the groups started. A copy of the final report to the Footpaths project will be emailed to all participants.

The first round of Footpaths groups began in October 2010. A second round of groups started in May 2011, and a third round in January 2012. Further rounds of groups are planned, but will start after the analysis phase of this research is concluded and so will not be included in this study.

3.2.2 Structure of Footpaths sessions

Each of the seven Footpaths sessions focused on a specific area of everyday life, but all the sessions shared common elements of exercises, games and discussion, and there was also some homework. The first session lasted two and a half hours and the rest of the sessions all lasted for two hours. All the sessions started with an introductory round to update since the previous session, followed by some combination of exercises and games and discussion, involving the whole group, small groups or in pairs. There was a closing round to allow participants to reflect on the session. The sessions covered climate change, home energy, waste and water, food, consumerism and transport. An overview of the main elements of the sessions follows.

Information on Cards

A number of exercises used cards with information on them which participants interacted with in a number of different ways. In the first session participants were issued with one card each which had information about one aspect of peak oil or climate change. Participants moved around sharing the information on their card with others.

In the third session there were two exercises based on cards. In the first exercise participants were given one card each with some facts about waste and water use. Participants were asked to read out one thing from their card that they found interesting and to talk about what they thought about it in a whole group session. In the other card-based exercise in the third session cards with items that needed to be disposed of were distributed and participants each read out a card to the whole group. Everyone made suggestions about how to deal with the item on the card based on the five Rs (refuse, reduce, repair, re-use, and recycle).

In the fourth session four cards were put out, one each for production, processing, packaging and transport, and participants were asked to rank them by which was the biggest proportional contributor to the carbon footprint of food. Participants worked together as a group to rank the cards.

In the fifth session each participant was given a card with an example of an appliance being used for a certain length of time and participants were asked to line up from low

to high energy use. Participants discussed whether they thought their thing was lower or higher than the others and sorted themselves into a line.

Games

There were three board games as part of the Footpaths programme. A board game focusing on low-carbon homes was played at the second session. In this game participants had to make decisions about what measures a hypothetical family might take to reduce the carbon emissions of their home. There was a board marked off in tonnes of CO_2 and participants were given cards which had actions that could be taken to reduce CO_2 with cost and amount of CO_2 on the cards. The size of the card was related to the size of CO_2 saving.

A similar game about transport was played as part of the sixth session with participants role-playing family members in a family who were aiming to reduce their carbon emissions arising from transport (Figure 3.2). Again there were cards describing different actions whose size was proportional to their CO_2 emissions. The family had to cut their carbon footprint from travel by a set amount over a number of rounds.

Figure 3.2 The transport game

The fourth session included a game around the carbon impact of foods, which consisted of a game board with four columns, one each for the categories of production,

processing, packaging, and transport. Participants were given cards with a food stuff and one of the four categories on it. In turn participants were asked to choose how high the relative carbon footprint of that aspect of their food item was by placing it higher or lower on the column. When all the cards were in place the actual CO_2 associated with that aspect of each foodstuff was examined.

Movement exercises

There were a number of exercises which involved movement. The first and third sessions included spectrum exercises where participants placed themselves at different places in the room depending on their degree of agreement with a number of statements. Participants at extreme ends were invited to explain their positions. In the first session two statements were made relating to climate change and social justice as part of the spectrum exercise. The third session included a spectrum exercise with two statements about water and one about waste. The first statement was about short showers rather than baths. The second statement was whether you thought about the country of origin and embodied water when buying things. The third statement was whether we only buy a few good quality items which last and can be mended.

A second movement exercise was included in the first session which involved moving across the room first envisaging what the world would be like in the future. Participants did this twice – the first time the future that participants were walking towards was how it would be if the world carried on with business as usual, where little had been done to address peak oil or climate change. Participants were asked to say what they imagined the world would be like and how they felt as they walked towards 2030 and when they got there. Participants then walked back across the room back to 2010. The exercise was repeated but participants were told that they were walking towards a future when the best possible things that could happen had happened. Again participants were asked to say what they imagined the world would be like and how they felt as they walked towards 2030 and when they got there.

Discussion Sessions

In addition to discussion associated with the card exercises, games and movement exercises, all sessions included structured opportunities for discussion in the form of

paired listening, small group discussion, and whole group discussion. Some discussion sessions focused on motivation for attending a Footpaths group, worries about participating in the group, and what barriers participants had encountered in attempting to reduce their carbon footprints. Others were concerned with information sharing through brainstorming and problem solving.

Homework

Participants were also encouraged to do homework between sessions. The homework around home energy use encouraged participants to start to monitor their home energy use through regularly reading their gas and electricity meters and to set goals for reducing their household energy consumption. Homework for waste and water and for consumerism encouraged participants to set targets for reducing waste and consumption by identifying specific actions they could take. Homework for food encouraged participants to keep a food diary and to use that to help inform changes they could make to their diets to reduce carbon emissions. Finally transport homework asked participants to monitor their travel energy use and emissions through calculating transport energy use for the past year and to make plans to reduce the carbon emissions associated with transport.

3.3 Study Design

3.3.1 Case study approach

A case study approach was chosen as the most appropriate design to fully explore the Footpaths project due to the nature of the data. First, given that only a limited number of people were expected to participate in the Footpaths programme during the course of the research, a research strategy involving a large data set was not feasible. Second, the research questions are concerned with the 'why' as well as the 'how' of change. Questions concerned with the process of change are well-suited to the in-depth investigation of the particular circumstances in which the change happens (Yin, 2009). Finally, the study included as many participants in the programme as possible, rather than adopting an experimental approach using samples and controls.

Yin (2009 p.18) describes a case study as " an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context". He further states that a case study:

- *copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result*
- *relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result,*
- *benefits from the prior development of theoretical propositions to guide data collection and analysis.*

This study is best described as an "instrumental case study" as defined by Stake (1995). The study seeks to understand a single issue, promoting pro-environmental behaviour, and seeks to aid understanding of this issue through studying a particular intervention type which has previously been successful at facilitating significant and durable behaviour change.

3.3.2 Philosophical assumptions

In designing the evaluation of the Footpaths programme a research methodology was identified to allow the collection of multiple types of data over time. A research methodology is an overall framework that informs the collection and analysis of data. The development of a research methodology is informed, whether consciously or not, by philosophical assumptions relating to ontology, the nature of reality, and epistemology, that is, how we can know about reality (Creswell and Clark, 2007). All research is guided by an underlying world-view or paradigm which contains "a basic set of beliefs or assumptions that guide our inquiries" (Creswell and Clark, 2007, p. 21). These paradigms encompass both ontological and epistemological standpoints and are often associated with particular methodologies (Creswell, 2007). There is an ongoing tension in social research between adherents of a positivist paradigm who "maintain that one reality exists and that it is the researchers job to discover what it is" (Robson, 2002, p.27) and adherents of constructivism who do not believe there is an objective reality which can be known, but rather hold that knowledge and meaning are socially constructed (Robson 2002). The positivist paradigm encompasses an objective ontology and an empiricist epistemology and relies on numerical methods and deductive

reasoning, while the constructivist paradigm combines a subjective ontology and a constructivist or interpretivist epistemology and is associated with inductive reasoning and qualitative methods.

A third paradigm, pragmatism, embraces the duality of the positivist and constructivist paradigms and views knowledge both as based on the reality of an external world and as socially constructed. Pragmatism is concerned with results rather than the nature of reality and focuses on answering the question of interest to the researcher by whatever methods are most appropriate. The emphasis is therefore on the research problem, and the researcher is free to adopt the approaches which are most helpful in understanding the problem. This approach breaks the traditional link between world-views and methodology and allows researchers to draw from different traditions of research (Creswell and Clark, 2007). As pragmatism allows the mixing of inductive and deductive reasoning, and qualitative and quantitative data, mixed-methods approaches are often associated with the pragmatic paradigm (Teddlie and Tashakkori, 2009).

The research presented here is based on a pragmatic paradigm, using a mixed-methods approach combining quantitative and qualitative data to facilitate understanding of both measurable results and the processes leading to those results (Teddlie and Tashakkori, 2009). This approach encompasses a post-positivist paradigm in the collection and analysis of numeric data which is held to reflect a measurable and objective reality. For the qualitative data, however, a measurable and objective reality is not assumed as responses from participants are subjective and dependent on context. The paradigm underlying the qualitative elements of the research is not informed by a fundamental constructivist perspective, however, as participants' words are considered to be related directly to participants' experience in the real world, while recognising that there is no certainty that these responses accurately represent a participant's inner reality.

3.3.3 Longitudinal mixed-methods design

The overall aim of this study was to examine how group-based interventions might facilitate significant and durable increases in pro-environmental behaviour. A longitudinal design was developed to explore the effectiveness of the Footpaths programme through assessment of any changes following participation in a Footpaths

Table 3.1 Data sources used to address the research questions

		Research method	Data	Reason for use of research method
1.	Do participants in a group-based intervention change their behaviour and reduce their carbon footprints after taking part in a group?	Questionnaire Carbon footprint	Quantitative – self-report and objective	To collect longitudinal data to measure changes in behaviour
2.	Are any increases in pro-environmental behaviour and reductions in carbon footprint and energy use durable?	Questionnaire Carbon footprint	Quantitative – self-report and objective	To collect longitudinal data to assess durability of any change in behaviour
3.	Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?	Questionnaire	Quantitative-self-report	To collect data on measures related to the RPM
		Observation Interview	Qualitative	To explore the factors that influenced participants in making changes to their behaviour
4.	Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased understanding, effectiveness and potential for meaningful action?	Questionnaire Carbon footprint	Quantitative – self-report and objective	To allow exploration of statistical relationships between RPM variables and changes in behaviour
5.	What other elements of the environment provided by group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?	Observation Interview	Qualitative	To explore the factors that influenced participants in making changes to their behaviour

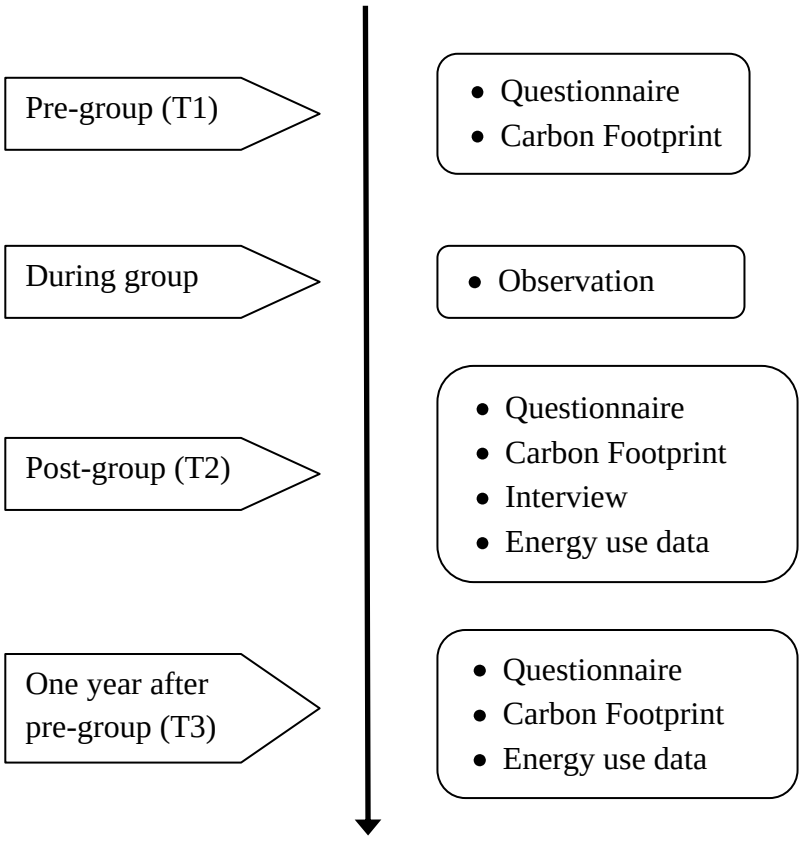
group, and to assess the durability of such changes. The research questions posed at the end of Chapter 2 required the collection of both quantitative data, to assess changes in pre-determined measures, and qualitative data, to explore those measures further and to identify other elements present within the groups which may have influenced the behaviour of the participants. This complementary data collection was also chosen to allow triangulation of results to provide a deeper and more robust explanation of the processes underlying the effectiveness of the group-based programme. Table 3.1 shows how the study design attempts to explore the research questions posed at the end of Chapter 2.

Data were collected at four time points: at the start of the series of group sessions; during the series of group sessions; at the end of the series; and one year after the start of the series. The data collection timeline for the study is shown in Figure 3.3. Baseline data on pro-environmental behaviour, carbon footprint, and psychological measures were collected pre-group. Post-group data were collected on the same measures and also on energy use for the year preceding the group start date. One year post-group data were collected on the same measures, as well as energy use data for the year following the group start date. Qualitative data were collected in the form of observations during the sessions and in the form of interviews immediately after the sessions finished.

Figure 3.4 shows the study design in more detail. Data were collected from all participants who were willing to take part in the study rather than adopting a sampling strategy due to the small number of participants. Socio-demographic data were collected by questionnaire before the groups began (pre-group, T1), immediately after the groups finished (post-group, T2) and one year after the groups started (T3). Information about world-view and attitude was collected at T1 and T3 to examine whether there was any longer term effect on these measures.

Self-reported pro-environmental behaviour was assessed by questionnaire at T1, T2 and T3. Emissions calculated from recorded energy use data for household energy use and transport energy were collected by questionnaire at T2 for the year ending at T1 and at T3 for the year ending at T3 to allow direct comparisons of energy use and related emissions. Carbon footprints for each participant were assessed using a carbon footprint form at all three times.

Figure 3.3 Data collection timeline

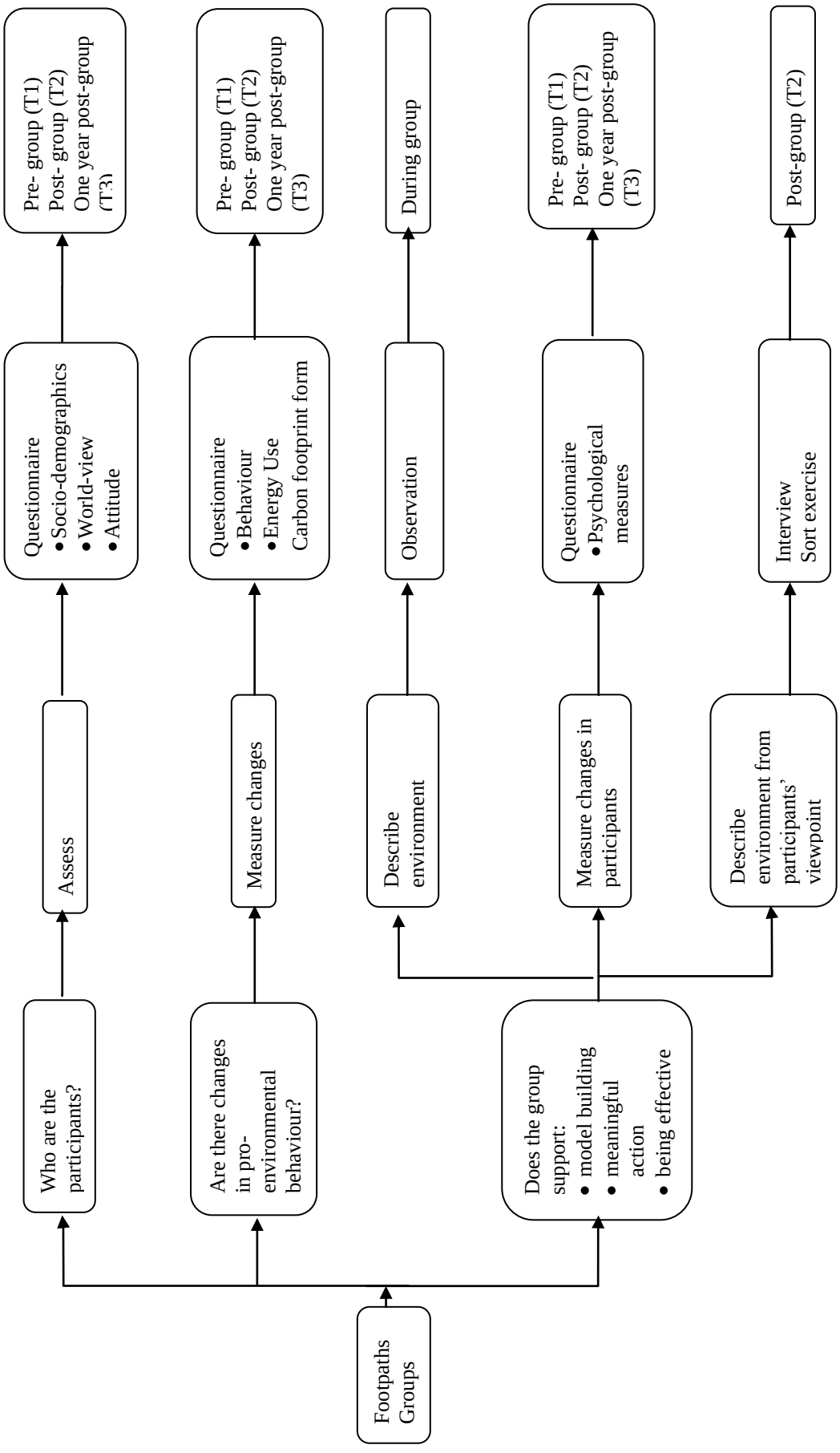


Changes in psychological measures thought to be related to the RPM were explored by collecting data by questionnaire at T1, T2 and T3.

All seven sessions of one group were observed to allow direct assessment of the environment provided by the group sessions. In addition, all of the participants in the first round of groups were asked to participate in interviews to attempt to understand the experience of the groups by participants. Semi-structured interviews were conducted immediately after the last group meeting (T2) to look for self-reported changes in behaviour and knowledge which might relate to participation in the group and to try to gain an understanding of what elements of the group might have facilitated these changes.

Details of the development of measures, and the procedures and materials used in the collection of quantitative data are provided in Chapter 4 where the quantitative study is described in detail. Details of data collection for the qualitative study are provided in Chapter 5 as part of the detailed description of the qualitative study.

Figure 3.4 Footpaths Study Design



3.3.4 Ethical concerns

Ethical approval was sought and obtained from the De Montfort University Human Research Ethics Committee. All information collected during the course of this study has been held and processed in compliance with the Data Protection Act 1998. All information has been anonymised and is stored in a secure location. Consent was acquired in writing from all participants for each aspect of data collection (Appendix 2).

3.3.5 Validity

Validity in research is related both to the study design and to the measures used. The study design adopted here addresses issues of validity through triangulation using qualitative and quantitative techniques to complement and confirm findings. It also attempts to use multiple measures for each construct, grounded as far as possible in previous research. In the quantitative part of the study both measures with face validity, developed by the researcher, and previously published scales relating to the same constructs were used. Changes over time rather than absolute scores were used in the quantitative analysis for the outcome variables frequency of pro-environmental behaviour and carbon footprint as respondents tend to over-report pro-environmental behaviour in comparison with their actual behaviour as reported by others (Chao and Lam, 2011).

There has also been concern expressed in the literature that self-report measures of environmental attitude and behaviour may be affected by social desirability bias (Thøgersen and Ölander, 2006). However Milfont (2009), in a study that expressly addressed the issue of social desirable responding on environmental attitudes and behaviour, concluded that social desirability had no strong impact on answers to questions relating to either environmental attitudes or behaviours in anonymous questionnaires. To help protect against socially desirable responding, changes over time were also used for all psychological measures. The emissions calculated from recorded energy use provide a further outcome variable less subject to report bias. In the qualitative part of the study results from observations, interviews and from a paper sort exercise were used to complement and confirm each other.

3.3.6 Participant recruitment

Participants for the Footpaths groups were recruited by the Footpaths project either directly through the Transition Leicester web site, events and stalls, or through existing networks such as Faith groups and neighbourhood groups. The first round of Footpaths groups consisted of a total of 36 people spread over five groups. Two of these groups were recruited from Faith groups, one from a local neighbourhood, one from the lesbian, gay, bisexual, and transgender identified community in Leicester, and one directly through the Transition Leicester web site, events and stalls. These groups met between October 2010 and March 2011, although each group started and finished at different times within that window. The second round of groups consisted of 30 participants from three neighbourhood groups and one group which was recruited from the local home-educating community. These groups met between May 2011 and October 2011. The third round consisted of 33 participants from four neighbourhood groups and one Faith group. These groups met between January 2012 and May 2012. Figure 3.5 shows the flow of participants through the study and recruitment and retention of participants is shown in Table 3.2. The timing of the research did not allow for T3 data to be collected for the third round of groups.

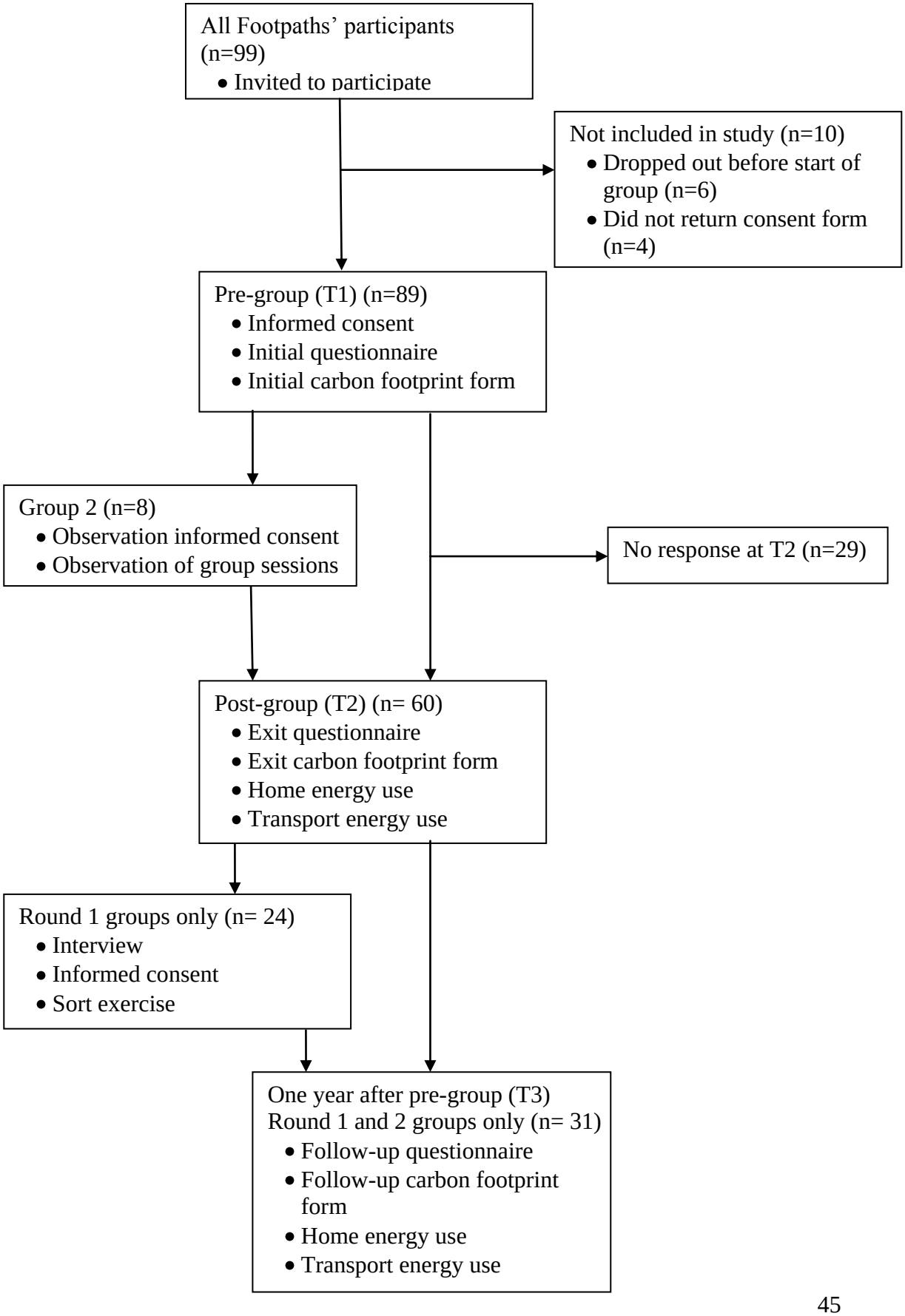
Most participants were willing to fill in questionnaires and carbon footprint forms at T1. Fewer participants provided information at T2 and fewer still at T3. The varying pattern of response between groups at T2 is partly attributable to the fact that some of the group facilitators asked participants to fill in the questionnaires and carbon footprint forms at the last group session, whilst others handed out the forms and participants completed them in their own time. Questionnaires and carbon footprint forms were posted to participants at T3, and participants were asked to return them by post. Further information on quantitative data collection is provided in Chapter 4.

Interviewees were all drawn from the first round of groups to allow time for in-depth analysis of the interview data, and observations were only conducted on Group 2, one of the Faith groups. Further information on qualitative data collection is provided in Chapter 5.

Table 3.2 Number of participants in Footpaths group returning information at various times

Round	Group	Number in group	Number of participants at T1	Number of participants at T2	Number of participants at T3	Number Interviewed
	1	6	6	3	1	3
1	2	8	8	8	5	5
	3	8	6	5	5	4
	4	5	5	5	5	5
	5	9	9	6	6	7
	6			Did not run		
	7	8	6	6	5	
2	8	10	9	6	2	
	9	7	7	2	2	
	10	5	4	2	0	
	11	8	6	3		
	12	4	4	2		
3	13	7	5	4		
	14	5	5	2		
	15	9	9	6		
Total		99	89	60	31	24

Figure 3.5 Research design showing number of participants at each stage



3.4 Summary

This chapter described the Footpaths programme and presented the overall research design for this study. The timeline for the study and the different methods for data collection were outlined, and information was provided on participant recruitment and retention. Details of instruments and measures used to collect data are presented in Chapters 4 and 5, which report on the quantitative and qualitative aspects of this research.

Chapter 4: Quantitative Study

4.1 Introduction

The previous chapter described the Footpaths programme and presented the overall research design for this study. It connected the proposed methodology with the research questions put forward at the end of Chapter 2 and outlined the timeline for data collection. This chapter reports on the quantitative aspects of the study, the methods used for the collection and analysis of quantitative data and the principal results.

The quantitative part of the study attempts to quantify changes in behaviour, energy use, and carbon emissions for Footpaths' participants across a number of lifestyle elements (e.g. home energy use, transport, food, etc.). It also explores whether these changes are related to constructs from the Reasonable Person Model (RPM) (Kaplan and Kaplan, 2009). This involves operationalising the RPM and examining how the RPM relates to elements identified as potentially important in previous studies of group-based programmes promoting pro-environmental behaviour.

The RPM suggests that people behave more reasonably when the environment in which they are functioning supports their informational needs. In the light of the evidence on the anthropogenic causes of global climate change, and the potential for reducing individual carbon emissions, reasonable behaviour for those with pro-environmental world-views or attitudes would be to act to reduce individual carbon emissions. Therefore, for this study "reasonable" behaviour for people who are concerned about the environmental impact of their daily lives is operationalised as pro-environmental behaviour. The potential for pro-environmental behaviour to increase is then a function of the degree to which the Footpaths groups provide an environment supportive of informational needs.

The first four of the five research questions proposed in Chapter 2 are addressed by the quantitative part of this study.

1. *Do participants in a group-based intervention change their behaviour and reduce their carbon footprints after taking part in a group?*
2. *Are any increases in pro-environmental behaviour and reductions in carbon footprint and energy use durable?*

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*
4. *Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased model building, feelings of effectiveness and belief in meaningful action?*

4.2 Method - Procedures and materials

Four categories of quantitative data were collected from participants: socio-demographic characteristics, frequency of pro-environmental behaviour, size of carbon footprint and recorded energy use. Data were also collected on psychological measures. Data were collected by questionnaires and carbon footprint forms pre-group (T1), immediately post-group (T2), and one year after pre-group (T 3). All the participants in the first three rounds of Footpaths groups were asked to participate. Figure 4.1 below shows the instruments used and the number of participants at each stage. Copies of the materials used are presented in Appendices 3 and 4.

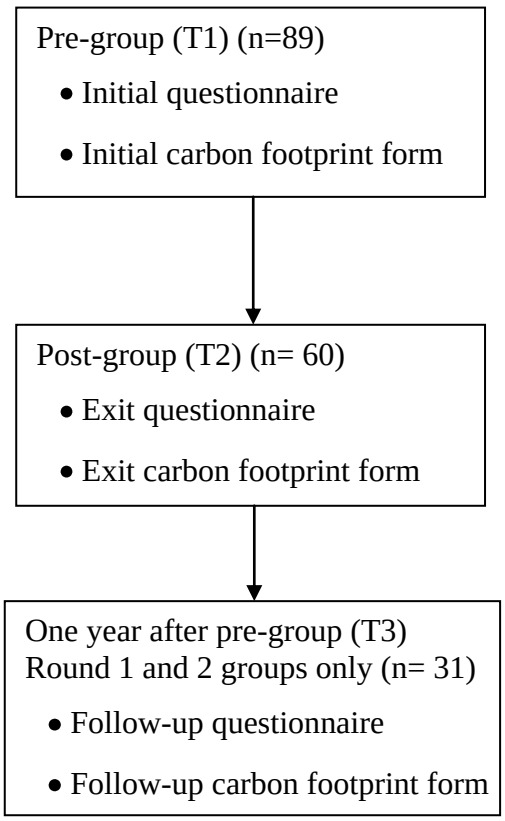
The initial questionnaire at T1 consisted of six pages of closed-ended questions to acquire:

- baseline measurements on constructs related to the RPM,
- baseline information on pro-environmental behaviour,
- basic demographic and household information,
- baseline data on environmental attitude and world-view.

The exit questionnaire at T2 also consisted of six pages of closed-ended questions to acquire:

- repeat measurements on constructs related to the RPM,
- repeat measurements on pro-environmental behaviour,
- data on household and transport energy use for the year ending at T1,
- repeat information of socio-demographic data which might have changed over time.

Figure 4.1 Instruments used to collect quantitative data and number of participants at each stage



The follow-up questionnaire at T3 consisted of six pages of closed-ended questions to acquire:

- repeat measurements on constructs related to the RPM,
- repeat measurements on pro-environmental behaviour,
- data on household and transport energy use for the year ending at T3,
- repeat information of socio-demographic data,
- repeat data on environmental attitude and world-view.

The carbon footprint form was the same at all three times.

The questionnaires were predominately composed of Likert-scale items measuring both frequency of pro-environmental behaviour and a number of constructs associated with the RPM which were expected to be related to frequency of pro-environmental behaviour. The following sections describe these constructs and the measures used to attempt to capture them.

4.2.1 Reasonable Person Model constructs: operationalising the RPM

Although Kaplan and Kaplan (2009) suggest that the RPM is potentially useful in understanding how to promote pro-environmental behaviour, they do not specify situations in which this understanding has been applied to human behaviour affecting climate change, and the model has not so far been operationalised in the field of pro-environmental behaviour change. Corbett (2005) attempted to apply an early version of the RPM (Kaplan, 2000) to travel behaviour, operationalising the model narrowly as self-interest, altruism, and personal control. As discussed previously (Chapter 2) these measures do not seem to relate well to the three domains of the RPM as recently described (Kaplan and Kaplan, 2009). Therefore it was decided to develop or adapt measures to explore the constructs within the RPM. A question consisting of nine statements was developed by the researcher to attempt to address the RPM concepts of model building, meaningful action and effectiveness directly (Table 4.1). Respondents were asked to indicate to how much they agreed with each of the nine items on a five-point Likert scale from "strongly disagree" to "strongly agree".

Six further questions attempted to explore RPM constructs either through previously validated scales thought to be related to the RPM or through questions devised specifically for this study. The questions used to explore each construct are outlined below with an explanation of how they relate to past research into group-based interventions and to the RPM. Table 4.2 summarises the aim of each question used to operationalise the RPM and the source of the measures used.

<u>Model Building</u>

As applied to the study of group-based interventions, the RPM framework suggests that elements of the environment provided by the groups might influence participants' willingness to engage in pro-environmental behaviours. Looking at the three domains of the RPM, model building, being effective, and meaningful action, there are overlaps with elements suggested by Staats *et al.* (2004), Nye and Burgess (2008) and Hargreaves *et al.* (2008). Specifically the reasoned action described by Staats *et al.* (2004) and the discursive consciousness described by Nye and Burgess (2008) and Hargreaves *et al.* (2008) are both concerned with the exploration and

Table 4.1 Statements developed by researcher to assess RPM constructs directly. Responses were on a five-point Likert scale from strongly disagree to strongly agree.

Reasonable Person Model Domain	Construct	Item
Model building	Understanding	I am not sure what changes it would be possible for me to make to reduce my carbon footprint
	Exploration	I can imagine what my life would be like if I reduced my carbon footprint
	Confusion	I have a clear idea about what actions to take
Being effective	Overwhelm	I feel overwhelmed when I think about changing the way I live
	Confidence	I feel helpless when I think about reducing my carbon footprint
	Competence	It is difficult to understand how to apply information about reducing my carbon footprint to my daily life
Meaningful action	Responsibility	I believe I have a responsibility to reduce my carbon footprint
	Frustration	Trying to take action to reduce my carbon footprint is frustrating
	Participation	My actions can make a difference to climate change

Table 4.2 Items related to Reasonable Person Model (RPM)

Question	Aim	Source	RPM
Statements on taking action on reducing carbon footprint related to RPM	Attempt to capture participants' views of their **mental models** of carbon footprint reduction**, effectiveness** and ability to take **meaningful action**	Questions designed by researcher based on RPM and on themes identified in analysis of comments from participants in EcoTeams, CRAGS and Green Streets (Howell, 2009; Lockwood and Platt, 2009; Nye and Burgess, 2008)	All RPM constructs (see Table 4.1)
Mindfulness	Measuring **attention awareness mindfulness**	Questions from the Mindfulness Attention Awareness Scale (K. W. Brown and Ryan, 2003a)	Exploration
Knowledge of effective actions	Measuring **knowledge** of pro-environmental behaviours	Drawn from a list of most environmentally significant actions included in Appendix C of DEFRA's Framework for Environmental Behaviours (DEFRA, 2008)	Understanding
Confidence in ability to engage in various behaviours	Measuring **self-efficacy** which could be related to being effective from RPM.	Scale constructed by researcher based on Bandura's *Guide for constructing self-efficacy scales* (Bandura, 2005). Behaviours included match behaviours addressed in the groups	Confidence
Perceived ease	Measuring **competence**	Based on a scale developed for the 21st century home project (Gatersleben *et al.*, 2009).	Competence
Responsibility of actors	Measuring feelings of **personal responsibility**	Question designed by researcher asking for ascription of responsibility to various actors including individuals	Responsibility
Importance of actors	Measuring **participation**	Question designed by researcher asking for views on the importance of the role of various actors including individuals	Participation

application of information as opposed to habitual behaviour. This may be related to mindful behaviour which can be defined as the process of drawing novel distinctions which can lead to:

> *(1) A greater sensitivity to one's environment, (2) more openness to new information, (3) the creation of new categories for structuring perceptions, and (4) enhanced awareness of multiple perspectives in problem solving.* (Langer and Moldoveanu, 2000)

Mindfulness can be contrasted with mindlessness which is automatic or habitual behaviour as described by Langer (2000) who states mindlessness is inversely related to mindfulness:

> *When we are in a state of mindlessness, we act like automatons who have been programmed to act according to the sense our behaviour made in the past rather than the present. Instead of actively drawing new distinctions, noticing new things, as we do when we are mindful, when we are mindless we rely on distinctions drawn in the past.*

Mindfulness as defined above seems to correspond both with the exploration construct within the model building domain of the RPM and with findings of previous researchers who suggest that group-based interventions are successful partly because they move behaviour from the realms of habit into those of reasoned behaviour or discursive consciousness. One way of measuring model building might therefore be to look for a decrease in mindless behaviour as the result of the potential of the group to provide opportunities to explore information and to build new mental models of climate change, human impacts, and possible changes in lifestyle. Although mindfulness is regarded by some as a dispositional attribute (Brown and Ryan 2003) and would therefore be unlikely to be influenced by participation in a Footpaths group, others regard it as a state (Langer, 2000) which might be changed as a result of external stimulus.

Support for a relationship between mindfulness and pro-environmental behaviour is provided in a study by Brown and Kasser (2005) who used the 15 item Mindfulness Attention Awareness Scale (MAAS) (Brown and Ryan, 2003) to explore subjective well-being and environmentally responsible behaviour. Using structural equation

modelling they demonstrated that mindfulness was related to both subjective well-being and to environmentally responsible behaviour.

Amel *et al.* (2009) also found a relationship between mindfulness and environmentally responsible behaviour. Using two subscales of the Five Domain Mindfulness Questionnaire (Baer *et al*. 2006), acting with awareness and attending to one's experiences, they found that the acting with awareness domain of mindfulness was positively correlated with self-reported environmentally responsible behaviour. The acting with awareness subscale of the Five Domain Mindfulness Questionnaire is based heavily on the MAAS with 8 of its 15 items drawn from the MAAS (Baer, Smith, Hopkins, Krietemeyer, and Toney, 2006).

As the Mindfulness Acting with Awareness Scale (Brown and Ryan, 2003) appears to have been linked with environmentally responsible behaviour in two previous studies, it was used in this study to try to assess the exploration aspect of model building in relation to pro-environmental behaviour. The MAAS was included in the questionnaires at T1, T2 and T3 to assess any change in reported mindfulness after participating in a Footpaths group. Participants were asked to rate from "almost never" to "almost always" how frequently they experienced each of the 15 items on a six-point Likert scale.

Other constructs which might reflect on the ability of the environment to support model building are:

- a reduction in confusion
- an increase in understanding about environmental impacts of lifestyles and about actions that could be taken to limit the impacts

These constructs were operationalised through three questions developed by the researcher as part of the set of nine questions which sought to directly assess RPM constructs. These questions sought to establish changes in understanding of information, reductions in confusion, and changes in ability to imagine a changed lifestyle (Table 4.1). These questions were included at T1, T2 and T3 to measure changes over time which might be related to the ability of the Footpath group to support model building. Respondents were asked to indicate to how much they agreed with each of the nine items on a five-point Likert scale from "strongly disagree" to "strongly agree".

In addition a question was included at all three times which sought to directly assess whether participants increased their understanding of which actions are most effective in reducing a household's carbon emissions. Participants were asked to indicate the three actions they thought would make the biggest difference to a household's carbon emissions from a list of seven actions whose impact had been calculated by DEFRA (DEFRA, 2008).

Being Effective

The being effective domain of the RPM includes feeling confident and competent. Feelings of confidence are linked to self-efficacy beliefs (Bandura, 2005) and therefore increases in self-efficacy might reflect increases in confidence. Self-efficacy was also identified by Staats *et al.* (2004), Nye and Burgess (2008) and Hargreaves *et al.* (2008) as possibly important to the effectiveness of group-based interventions but none of these researchers attempted to measure self-efficacy directly. Further support for the importance of self-efficacy in promoting pro-environmental behaviour is provided by a study by Heath and Gifford (2006) who found that self-efficacy explained most of the variance in behavioural intention in a study of pro-environmental behaviour, and links between self-efficacy and pro-environmental behaviour have been found in a number of other studies (Tabernero and Hernández, 2011) A question to assess self-efficacy beliefs was therefore designed to measure participants' confidence about making changes to their lives to reduce their environmental impact. An eight question scale was developed by the researcher following Bandura's guide for constructing self-efficacy scales (Baudura, 2005). Respondents were asked to rate how confident they were that they would be able to perform eight different actions on a ten-point scale from "cannot do at all" to "highly certain can do".

Other constructs which might reflect on the ability of the environment to provide opportunities for being effective are:

- competence
- feelings of being overwhelmed

Both Nye and Burgess (2008) and Hargreaves *et al.* (2008) suggest that competence is increased by participation in group-based interventions but do not attempt to measure it.

For this study competence was assessed through a question about how difficult participants thought it would be to make particular changes to their lives. It was based on a question used in the study of the 21st Century Living project (Gatersleben, White, Abrahamse, Jackson, and Uzzell, 2009). Following Gatersleben *et al.* (2009) the question was reframed in the later questionnaires to ask how difficult it was to make the changes. This set of questions was used to measure feelings of competence as perceived ease is likely to increase as competence increases. Respondents were asked to indicate how difficult they thought it would be to perform 20 different actions on a six-point Likert scale from "very difficult" to "already doing this".

Overwhelm as the opposite of clarity, confidence and competence were operationalised through three questions developed by the researcher which directly addressed these constructs (Table 4.1). All the questions related to the being effective domain were included at T1, T2, and T3 to assess change over time which might reflect the ability of the Footpath group to promote increased feelings of effectiveness. Respondents were asked to indicate to how much they agreed with each of the nine items on a five-point Likert scale from "strongly disagree" to "strongly agree".

Meaningful Action

The meaningful action domain of the RPM includes participation and being needed (Kaplan and Kaplan, 2008). Nye and Burgess (2008) suggest that an increase in perceived personal control is important to the success of the group-based interventions. Kaplan (2000) argues that participation rather than control is important and suggests that opportunities to take meaningful action reduce feelings of helplessness. This domain of the RPM was assessed through questions developed by the researcher addressing changes in feelings of frustration, participation, and feelings of responsibility which Kaplan and Kaplan (2008) suggest are related to meaningful action (Table 4.1). Respondents were asked to indicate to how much they agreed with each of the three items on a five-point Likert scale from "strongly disagree" to "strongly agree".

Two further questions were included which asked participants to assess feelings of participation and feelings of responsibility. One asked participants to rate the importance of government, business and industry, communities and individuals in tackling climate change on a five-point Likert scale ranging from "not at all important"

to “very important”. The second question asked participants to indicate how much responsibility they thought government, business and industry, communities and individuals should take for tackling climate change on a five-point scale ranging from “none” to “a lot”.

All of the items related to meaningful action were included at T1, T2 and T3 to assess whether there was any change over time which might relate to the ability of the Footpaths group to support meaningful action.

4.2.2 Measures of pro-environmental world-view and attitude

Data on environmental world-view and attitude were also collected both to help characterise the participants and to determine whether participation in a Footpaths group affected environmental world-view or attitude. Environmental world-view was assesed using the New Ecological Paradigm scale (Dunlap, Van Liere, Mertig, and Jones, 2000). This scale was chosen because it is a well-validated scale which has been widely used in studies of pro-environmental behaviour (Dunlap, 2008). It was included to provide a measure of pro-environmental world-view of participants at T1. It was not included at T2, but was included at T3 to assess whether there was any long-term change in world-view. Respondents were asked to indicate how much they agreed with 15 statements on a five-point Likert scale ranging from “strongly disagree” to “strongly agree”.

A measure of pro-environmental attitude was derived from the market segment categories presented in DEFRA’s “Framework for pro-environmental behaviours” (DEFRA 2009). This seven-category classification of the UK public in terms of pro-environmental attitudes and behaviours is included as a standardised way of categorising the participants. Category one indicates the most environmentally concerned/engaged and category seven the least concerned/engaged. The categories were relabelled and presented in a random order in the questionnaires. Participants were asked to indicate which of the one or two sentence summaries of the seven categories identified in the framework was closest to how they thought and felt. This question was included at T1, and again at T3 to assess whether there was any long-term change in attitude.

4.2.3 Frequency of pro-environmental behaviour

Frequency of pro-environmental behaviour was measured with a questionnaire item consisting of 14 statements about behaviour. The 14 statements were compiled by the researcher based on the DEFRA Tracker Survey of pro-environmental attitudes and behaviour in the UK (Thornton, 2009) and reflected knowledge areas addressed by the Footpaths project. Three statements were negatively worded and there were five response categories ranging from "never" to "always". The question was designed to reflect a range of pro-environmental behaviours and appeared on questionnaires at T1, T2 and T3. The use of baseline and repeat measurements allowed assessment of the extent and durability of any changes in pro-environmental behaviour over time. It also allowed some comparison with the general population.

Participants were also asked to report any changes they had made and any changes they were planning to make as a result of participating in the Footpaths programme in open-ended questions included in the questionnaires at T2 and T3.

4.2.4 Carbon footprint measure

Osbaldiston and Schott (2012) suggest that it is important to measure the impact of pro-environmental behaviour change programmes in terms of their actual environmental impact and not just in terms of changed behaviour. They suggest that the carbon footprint measure may be an appropriate way to compare various behaviours quantitatively. The Footpaths programme was designed specifically to help participants to reduce their carbon footprint and the project organisers chose to use a version of the Centre for Alternative Technology carbon footprint calculator provided by Cambridge Carbon Conversations (Randall, 2009). This calculator provides an overall carbon footprint in tonnes of CO_2 equivalent, and also provides a breakdown of the footprint into 8 lifestyle areas: home heating, hot water, lighting and appliances, car travel, other surface travel, air travel, food, general consumption and infrastructure. A software tool allows approximate carbon emissions to be derived from the answers to 33 questions. A copy of the form can be found in Appendix 4 and Figure 4.2 shows an example of the output from the calculator. Data for calculating carbon footprints for each participant were collected at T1, T2 and T3.

Figure 4.2 Example of carbon footprint calculator output (Transition Leicester, 2010)

Your estimated carbon footprint is 13.01 tonnes CO_2 per year

Breakdown of your footprint	Your CO_2 (tonnes per year)	UK average
Space heating	0.69	1.2
Water heating	0.43	0.5
Domestic lighting, appliances and cooking	0.46	0.8
Car travel	0.87	1.1
Other surface travel	0.06	0.2
Air travel	4.90	0.6
Food and drink	1.67	2.9
Household goods	2.25	2.9
Infrastructure allowance	1.70	1.7

UK average=12 tonnes, UK 2050 target=2 tonnes, USA average=20 tonnes, Tanzania average=0.1 tonnes, world average=4.5 tonnes

4.2.5 Recorded energy use

During the course of the sessions participants were asked to work out and record their household carbon emissions based on their use of energy within the home. This energy use was derived from detailed billing information and/or from meter readings. They were also asked to work out their transport carbon emissions for the previous year based on odometer readings and/or travel emissions calculators. Both energy and emissions data were recorded by participants in their handbooks, and were requested in the exit questionnaire at T2. Participants were asked for household and transport energy use and emissions information for the year following the start of the Footpaths sessions in the follow-up questionnaire at T3. Household energy use and emissions data were calculated per household and divided by the number of people in the household to

provide individual energy use and emissions figures. Transport energy use and emission data were calculated per person.

4.2.6 Additional questions

A few additional questions were included in the questionnaires. Table 4.3 presents a list of all the measures included in the three questionnaires, outlines the aim of including each measure, the source of the items included, and the place of each measure in each questionnaire. In the initial questionnaire at T1 participants were asked to choose from a list of reasons for joining a Footpaths group at the request of the Footpaths project. The final questionnaire at T2 contained a number of evaluation questions at the request of the Footpaths project. These included a question where participants were asked to rate elements of the programme, a question where participants were asked to rate aspects of the handbook, and a question where participants were asked to rate the most important factors in the programme. This question assessing the most important factors in the programme was based on a question used by EcoTeams to evaluate the UK EcoTeams programme (Global Action Plan, 2008). In the final questionnaire at T2 and in the follow-up questionnaire at T3 participants were asked to rate how much more they were doing to decrease their carbon footprint, and were also asked to volunteer information on changes that they had made or were planning to make to their lifestyles to reduce their carbon footprint.

Table 4.3 Measures included in each questionnaire

Measure	Aim	Source	Question
Statements on taking action on reducing carbon footprint related to RPM	Attempt to capture participants' views of their **understanding, effectiveness** and ability to take **meaningful action**	Questions designed by researcher based on RPM and on themes identified in analysis of comments from participants in EcoTeams, CRAGS and Green Streets (Howell, 2009; Lockwood and Platt, 2009; Nye and Burgess, 2008)	T1, question 4 T2, question 6 T3 question 3
Confidence in ability to do various behaviours	Measuring **self-efficacy** which could be related to being effective from RPM.	Scale constructed by researcher based on Bandura's *Guide for constructing self-efficacy scales* (Bandura, 2005). Categories match the categories studied in the groups	T1, question 5 T2, question 5 T3, question 2

Measure	Aim	Source	Question
Perceived ease	Measuring **competence**	Based on a scale developed for the 21st century home project (Gatersleben *et al.*, 2009).	T1, question 7 T2, question 8 T3, question 5
Mindfulness	Measuring **attention awareness mindfulness**	Questions from the acting with awareness domain of the Five Factor Mindfulness Scale (Baer *et al.*, 2006)	T1, question 8 T2, question 7 T3, question 4
Self reported pro-environmental behaviours	Measuring **frequency** of pro-environmental behaviours	Drawn from lists of behaviours used by DEFRA (Thornton, 2009) so some comparison with overall population	T1, question 3 T2, question 4 T3, question 1
Personal and household information	Measuring socio-demographic information	Questions matched to UK census categories	T1, question 12 T2, unnumbered T3, unnumbered
Importance of various actors in tackling climate change	Ascription of importance to self and others	Question designed by researcher asking for views on the importance of the role of various actors including individuals	T1, question 1 T2, question 10 T3, question 8
Responsibility	Ascription of responsibility of self and others	Question designed by researcher asking for ascription of responsibility to various actors including individuals	T1, question 9 T2, question 11 T3, question 7
Reason for joining group	For Footpaths organisers	Devised in conjunction with Footpaths project	T1, question 2
Evaluate programme	For Footpaths organisers	Devised in conjunction with Footpaths project	T2, question 1
Evaluate handbook	For Footpaths organisers	Devised in conjunction with Footpaths project	T2, question 2
Rate factors in programme	For Footpaths organisers	Questions used by UK EcoTeams evaluation (Global Action Plan, 2008)	T3, question 3
Knowledge of effective actions	Measuring **knowledge** of pro-environmental behaviours	Drawn from a list of most environmentally significant actions included in Appendix C of DEFRA's Framework for Environmental Behaviours (DEFRA, 2008)	T1, question 6 T2, question 9
New Ecological Paradigm	Measuring **pro-environmental attitude**	Questions from the New Ecological Paradigm (Dunlap *et al.*, 2000)	T1, question 4 T2, question 6 T3 question 3

4.2.7 Piloting and Administering the Questionnaires

A draft version of the initial questionnaire was piloted among a convenience sample (Robson, 2002) of around 15 people including fellow students, friends and family members. Piloting identified several questions which were ambiguous, hard to understand or which produced similar answers from all respondents. The questionnaire was revised and the final version of the questionnaire was piloted with the Footpath project organisers and members of Transition Leicester.

Administering the initial questionnaire – pre-group (T1)

Before the group sessions began (T1) all participants in the Footpaths project received a return envelope, a numbered copy of the initial questionnaire, a letter explaining the study, and two copies of an informed consent form, one to be retained and one to be signed and returned. They also received a carbon footprint form and a handbook provided by the Footpaths project. Participants were asked to return the questionnaire, a copy of the consent form, and the carbon footprint form to the researcher before the first group session. To ensure the fullest response to the questionnaire the researcher contacted the Footpaths organisers to update them on which questionnaires were returned and the Footpaths organisers issued reminders. Any questionnaires and/or forms not returned by post were collected by the facilitator at the first group meeting and sent to the researcher. If any questionnaires or forms were not completed by the time of the first group meeting, participants were invited to complete them at the meeting and pass them to the facilitator to send on to the researcher.

Administering the final questionnaire – immediately post-group (T2)

The researcher provided facilitators with an envelope for each participant who had agreed to participate in the study which contained a numbered copy of the final questionnaire, a letter thanking participants for their help, and a numbered carbon footprint form. These questionnaires and forms were completed at the final session (T2), placed in sealed envelopes and collected by the facilitators who sent them to the researcher, or completed after the session and returned directly by the participants. If anyone was not at the final session, the researcher posted the final questionnaire, letter and form to them with a return envelope. Any participants who did not complete the

questionnaire or carbon footprint form received a further copy of the questionnaire and/or carbon footprint form in the post with a follow-up letter asking them to complete and return the forms if they were willing to do so.

Administering the follow-up questionnaire – one year after pre-group (T3)

One year after the first group session (T3) a numbered copy of the follow-up questionnaire, a thank you letter, a numbered copy of the carbon footprint form, and a return envelope were sent to all participants. Any participants who did not return the questionnaire or carbon footprint form were sent a further copy of the questionnaire and/or carbon footprint form in the post with a follow-up letter asking them to complete and return the forms if they were willing to do so.

4.2.8 Analysis

Data screening

Negatively framed questions were reverse coded and numeric codes were assigned to questions with non-numeric response codes. Questionnaire and energy use data were entered in an Excel spreadsheet and then imported in SPSS 19. Answers from the carbon footprint forms were entered into the carbon footprint calculator and the results for each lifestyle area at each time for each participant were entered into an Excel spreadsheet and imported into SPSS 19 to allow comparison with other measures. Accuracy of data input was checked by visual examination of scatter plots and by examining means and standard deviations to identify clear outliers.

Quantitative Data

Scales developed for this study were analysed using factor analysis to explore the dimensionality of the scales and scores for scales or factors were calculated by averaging responses to the items within each scale or factor. Quantitative data were explored using simple descriptive statistics and graphical techniques to identify possible trends in the data. Changes in energy use, carbon footprint and pro-environmental behaviour over time were explored to determine whether there were significant changes over time, how durable any changes were and whether changes in these measures were related. Changes in measures related to the RPM were assessed to determine whether

participants showed increased mindfulness, understanding, self-efficacy, control, confidence and competence, and whether they showed a decrease in confusion, overwhelm and helplessness. Changes in RPM measures were also compared to changes in carbon footprint and pro-environmental behaviour and energy use to explore whether they were related. Normality testing was conducted for all variables and either paired t-tests or Wilcoxon Signed-ranks tests were used to determine significant differences. Simple bi-variate correlation was used to assess relationships between variables because the number of cases was insufficient for more sophisticated techniques such as multivariate regression analysis (Tabachnick, Fidell, and Osterlind, 2001). As most of the variables included were not normally distributed and the sample size was small Kendall's tau was used (Field, 2009). The value for tau, when calculated for the same data, is always lower than Pearson's r and therefore close attention should be paid to the significance level rather than the value of tau in interpreting the results from this test (Field, 2009). The demographic and household composition data were compared to other household data from Leicester, UK, and the relationship between participant characteristics and changes in pro-environmental behaviour and carbon footprint was explored. Appendix 5 presents a summary table of the principal statistical tests used in this study and the reason for their use.

4.3 Quantitative Results

4.3.1 Responses

Eighty-eight participants returned the initial questionnaire at T1, with 84 returning a completed carbon footprint form. Only 80 participants returned both questionnaire and carbon footprint form at T1. At T2, 60 participants returned the final questionnaire and 59 returned a carbon footprint form, with 54 returning both. At T3, 31 participants returned the follow-up questionnaire and 30 returned a carbon footprint form. Only 28 returned both at T3 (Table 4.4).

Table 4.4 Number of responses at each stage

	Questionnaire	Footprint	Questionnaire and Footprint
T1	88	86	80
T2	60	60	54
T3	31	29	28

4.3.2 Characteristics of participants

Table 4.5 presents a summary of the socio-demographic data collected about the 88 participants who completed a questionnaire at T1 and their households. Three-quarters of the participants were female, and over three-quarters were highly educated with degree-level or above qualifications. About three-quarters owned their own home, and about half of the households had more than two members. Nearly three-quarters of the participants were between 30 and 59 years old. Overall the participants and their households had similar characteristics to the population of Leicester as recorded in the 2001 census except that 75% of the participants were female and nearly 80% were educated to degree level or beyond compared to 17% in Leicester in the 2001 census for those educated to degree level or above. 75% owned their own houses compared to 70%in the census data. 64.8% were households without children compared to 67% in Leicester as recorded in the 2001 census. The frequency of one person households was lower than in the 2001 census at 21% compared to 32%, and two person households were more frequent at 34% compared to 28%. The number of larger households was largely in line with the census, and 11.4% were households with over 65s compared to 20% in the census. Household income varied from under £10,999 a year to over £90,000 with 38% having incomes less than £20,799 compared to a median household income for Leicester in 2010 of £20,680.

Table 4.5 Socio-demographic characteristics of Footpaths' participants

Variable		Number	Percentage
Gender			
	Female	66	(75%)
	Male	22	(25%)
Age			
	20 to 29	10	(11.4%)
	30 to 39	18	(20.5%)
	40 to 49	24	(27.3%)
	50 to 59	21	(23.9%)
	60 to 69	12	(13.6%)
	70 to 79	2	(2.3%)
	80 to 89	1	(1.1%)
Household size			
	1 person	19	(21.6%)
	2 person	30	(34.1%)
	3 person	14	(15.9%)
	4 person	17	(19.3%)
	5 person	5	(5.7%)
	6 person	3	(3.4%)
Tenure			
	Own house	29	(33%)
	Have a mortgage	37	(42%)
	Rent	20	(22.7%)
	Live rent free	1	(1.1%)
	other	1	(1.1%)
Income			
	Up to £10,399	10	(12.3%)
	£10,400 to £20,799	21	(25.9%)
	£20,800 to £31, 199	15	(18.5%)
	£31,200 to £41,599	15	(18.5%)
	£41,600 to £51,999	1	(1.2%)
	£52,000 to £59,999	9	(11.1%)
	£60,000 to £69,999	1	(1.2%)
	£70,000 to £79,999	2	(2.5%)
	£80,000 to £89,999	3	(3.7%)
	Above £90,000	4	(4.9%)
Qualifications			
	No formal qualifications	3	(3.4%)
	GCSE/O-level	5	(5.7%)
	A-level/Higher/BTEC	8	(8.7%)
	Vocational/NVQ	2	(2.3%)
	Degree or equivalent	36	(40.9%)
	Post-graduate qualification	34	(38.6%)

4.3.3 Reasons for joining Footpaths

Participants were asked their reason for joining a Footpaths group in the initial questionnaire at T1. The most common reason for joining was to reduce their carbon footprint, with learning more about climate change and being involved in something in the community being the second and third most common reasons (Table 4.6). There was no significant correlation between the reason for joining and changes in the frequency of pro-environmental behaviour or changes in carbon footprint

Table 4.6 Reasons for joining Footpaths group (N=88)

Reason for joining	Number of participants
Reduce your carbon footprint	41 (46%)
Learn more about climate change	18 (21%)
Be involved in something in your community / neighbourhood	16 (18%)
Other	8 (8%)
Meet new people	5 (6%)
Save money	1 (1%)

4.3.4 Carbon footprints and energy use

This study sought to determine whether Footpaths' participants reduced their energy use and carbon footprints over the course of the programme, and whether any changes were durable. A carbon footprint calculator was used to measure approximate carbon footprint in tonnes of CO_2 equivalent at T1, T2 and T3. Household and transport energy use data for the year ending at T1 and for the year between T1 and T3 were collected at T2 and T3.

Carbon footprint (measured in tonnes of CO_2) decreased between T1 and T2 with a further decrease between T2 and T3 with 45 of 60 participants reducing their carbon footprints between T1 and T2. Figure 4.3 plots the size of carbon footprint at T1 against the size of carbon footprint at T2. In cases falling on the diagonal line the size of carbon footprints did not change between T1 and T2, in all cases above the line the size of carbon footprint increased, and in all cases below the line the size of carbon footprint

decreased. Figure 4.4 plots the size of carbon footprint at T2 against size of carbon footprint at T3. Comparing the graphs it is clear that the size of carbon footprint decreased for a majority of participants between T1 and T2 and between T2 and T3.

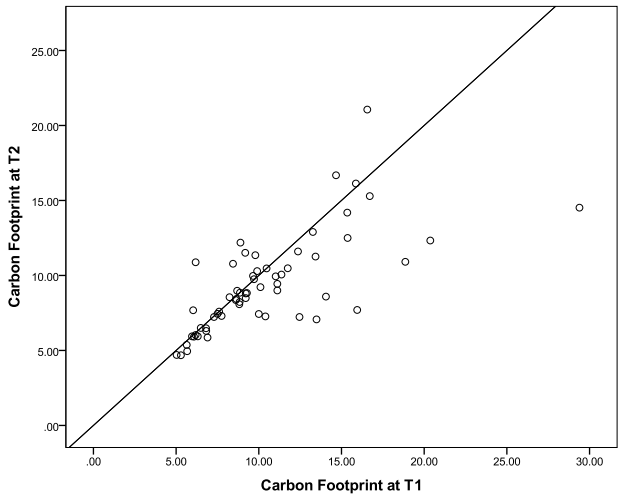


Figure 4.3 Change in size of carbon footprint between T1 and T2.

The diagonal line represents no change in carbon footprint between T1 and T2. Carbon footprint is measured in tonnes of CO2 equivalent.

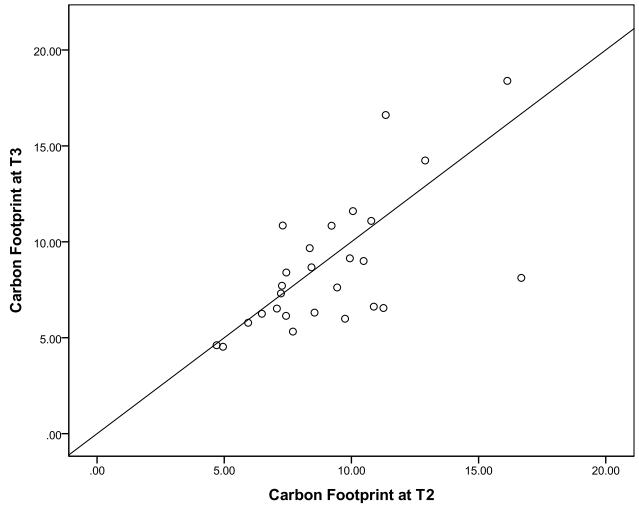


Figure 4.4 Change in size of carbon footprint between T2 and T3.

The diagonal line represents no change in carbon footprint between T2 and 3. Carbon footprint is measured in tonnes of CO2 equivalent.

The carbon footprint at T1 ranged from a low of 5.03 tonnes to a high of 50.44 tonnes with a mean of 10.98 tonnes of CO_2 (N = 86, SD = 6.286). At T2 the carbon footprint varied from 4.68 tonnes to 21.06 tonnes with a mean of 9.36 tonnes of CO_2 (N = 60, SD = 3.188) and the footprint at T3 varied from 4.53 tonnes to 18.39 tonnes with a mean of 8.56 tonnes CO_2 (N = 29, SD = 3.353). Carbon footprint at T1 had a skewness of 3.53 (SE=.260) and a kurtosis of 18.45 (SE =.514), at T2 skewness was 1.204 (SE=.309) and kurtosis was 2.175 (SE =.608), and at T3 skewness was 1.48 (SE=.434) and kurtosis was 2.127 (SE =.845). A Shapiro-Wilk test for normality confirmed that carbon footprint was not normally distributed at T1 (W(86) =.686, p < 000), at T2 (W(60)

=.925, p =.001) or at T3 (W(29) =.863, p =.001). A Shapiro-Wilk test for normality was used here rather than the more commonly used Kolmogorov-Smirnov test due to the small sample size (Field, 2009).

The median scores for carbon footprint (measured in tonnes of CO_2) are shown in Table 4.7. A related-samples Wilcoxon Signed-ranks test indicated that there was a significant difference between T1 and T2 carbon footprint scores (z = - 3.283, p =.001) with a moderate effect size (r =.30.) There was not a significant difference between sizes of carbon footprints between T2 and T3 (z = -.721, p =.471) or between T1 and T3 (z = -1.622, p =.105). This suggests that the reduction in carbon footprint size for Footpaths' participants was significant but it is unclear whether the reduction was durable as the lack of significant change from T2 to T3 suggests durability, but the lack of statistically significant change from T1 to T3 suggests that the reduction was not durable. However, the overall reduction in carbon footprint size between T2 and T3 suggests that there was a continuing effect on carbon footprint size. The lack of a statistically significant difference may be influenced by the small N (29) at T3 and the use of a non-parametric test which may lack power for small sample sizes (McCluskey and Lalkhen, 2007)

Median carbon footprint size is presented in Table 4.7 for T1 calculated from scores for all the participants who provided data at T1 (N=88). Median carbon footprint size for T1 and T2 was calculated for the subset of participants who provided data at T1 and T2 (N=60), and for T3 for the subset of participants who provided data at all three times (N=29). The 29 participants who provided carbon footprint data at all three times had a higher than average starting carbon footprint compared to all the participants who provided data at T1, and all the participants who provided data at T2. At T2 their carbon footprints were close to the median carbon footprint for all participants who provided data at T2, and overall they reduced their carbon footprints by 2 tonnes of CO_2 between T1 and T3. The 60 participants who provided data at T1 and T2 had a starting footprint close to average for all participants who provided data at T1 and these 60 reduced their footprints by 440 kg of CO_2 between T1 and T2.

Table 4.7 Median carbon footprints for all participants, for participants who provided data at T1 and T2, and for participants who provided data at all three times

	Number of cases	Median carbon footprint in tonnes of CO_2		
		T1	T2	T3
Participants who provided data only at T1	86	9.20		
Participants who provided data at T1 and T2	60	9.25	8.81	
Participants who provided data at T1, T2 and T3	29	9.71	8.85	7.71

The overall carbon footprint was calculated from answers to questions addressing eight different aspects of lifestyle. The results for carbon footprint size for each area are presented in Table 4.8. The median carbon footprint for T1 was calculated from scores for all the participants (N= 86) who provided data at T1. Median carbon footprint size for T1 and T2 was calculated for the subset of participants who provided data at T1 and T2 (N=60), and for T3 for the subset of participants who provided data at all three times (N=29). Overall absolute reductions in carbon footprint for each area are shown in Table 4.9.

As none of these variables for the different lifestyle areas were normally distributed Wilcoxon signed-rank tests were used to test for significant differences between scores at the three times (Table 4.10). The carbon footprint associated with space heating, water heating, lighting and appliances, food and household goods all showed significant reductions over time.

The changes in overall carbon footprint between T1 and T2 were not significantly correlated with any of the socio-demographic characteristics measured (Appendix 6). There was a significant positive correlation between change in carbon footprint between T1 and T3 and level of qualification ($n = 31$, $\tau = .297$, $p = .043$). This may be explained by a greater financial capacity to make changes as there was also a significant positive correlation between qualifications and household income ($n=81$, $\tau = .358$, $p < .001$).

Table 4.8 Carbon footprint by lifestyle area

	Data provided at	Number of cases	Median carbon footprint in tonnes of CO_2 T1	T2	T3
Space heating	T1 only	86	.9		
	T1 and T2	60	.96	.92	
	T1, T2 and T3	29	.90	.86	.81
Water heating	T1 only	86	.41		
	T1 and T2	60	.41	.27	
	T1, T2 and T3	29	.43	.41	.41
Lighting and appliances	T1 only	86	.40		
	T1 and T2	60	.39	.35	
	T1, T2 and T3	29	.36	.29	.32
Car travel	T1 only	86	.32		
	T1 and T2	60	.31	.33	
	T1, T2 and T3	29	.28	.47	.27
Surface travel	T1 only	86	.07		
	T1 and T2	60	.06	.06	
	T1, T2 and T3	29	.05	.1	.07
Air travel	T1 only	86	.60		
	T1 and T2	60	.9	.9	
	T1, T2 and T3	29	0	.90	0
Food	T1 only	86	1.81		
	T1 and T2	60	1.73	1.41	
	T1, T2 and T3	29	1.29	1.15	1.41
Household goods	T1 only	86	1.75		
	T1 and T2	60	1.75	1.75	
	T1, T2 and T3	29	2.02	1.92	1.66

Table 4.9 Total reductions in carbon emissions for all Footpaths' participants in tonnes of CO_2

	Reduction between T1 and T2 (N=60)	Reduction between T2 and T3 (N = 29)	Overall reduction
Space heating	3.59	2.25	5.84
Water heating	3.02	-.64	2.38
Lighting and appliances	2.40	-.03	2.37
Car travel	-.37	1.93	1.56
Surface travel	-.30	-.74	-1.04
Air travel	26.40	5.50	31.90
Food	19.81	.61	20.42
Household goods	8.96	5.46	14.42
Total	63.51	13.84	77.35

Table 4.10 Results of Wilcoxon signed-ranks test for carbon footprint by lifestyle area. Significant results and moderate and large effect sizes are in bold

	T1 T2 (N=60)			T2 T3 (N=29)			T1 T3 (N=29)		
	z	*p*	*r*	*z*	*p*	*r*	*z*	*p*	*r*
Space heating	-1.422	.155	0.130	**-2.528**	**.011**	**0.339**	-2.190	.029	0.407
Water heating	**-3.293**	**.001**	**0.301**	-1.162	.245	0.153	**-3.316**	**.001**	**0.616**
Lighting and appliances	**-3.583**	**.000**	**0.327**	-.079	.937	0.010	-1.591	.112	0.295
Car travel	-.631	.528	0.058	-1.007	.341	0.132	-.713	.476	0.136
Surface travel	-.944	.345	0.086	-.541	.588	0.071	-.976	.329	0.181
Air travel	-.888	.375	0.081	-.215	.830	0.028	-.380	.704	0.071
Food	**-4.558**	**.000**	**0.416**	-.626	.531	0.082	**-2.616**	**.009**	**0.486**
Household goods	-1.056	.291	0.096	-1.862	.063	0.245	**-2.662**	**.008**	**0.494**

4.3.5 Energy use from bills, meter and odometer readings

Information about emissions calculated from recorded energy use over the year ending at T1 was collected from participants at T2, from data they recorded during the course of the Footpaths sessions, and at T3 for the year between T1 and T3. Only 21 participants provided data related to recorded home energy use obtained from billing information or meter readings at both times and only 22 participants provided data related to travel energy use from travel calculators or odometer readings at both times. The results are presented in Table 4.11.

Table 4.11 Actual emissions for Footpaths' participants calculated from recorded energy use

Mean energy use per person	Year before Footpaths in $kgCO_2$	Year after Footpaths in $kgCO_2$	Difference in kg CO_2	Percentage reduction in mean
Flying energy use (N=13)	1688	436	1251	74%
Home energy use (N=21)	2064	1614	450	22%
Car travel energy use (N=22)	851	888	-36	-4 %

When emissions from actual energy use were compared with carbon footprint results (Table 4.12) there were significant correlations which suggest that the carbon footprint measure used might relate to emissions from actual energy use. As the variables were not normally distributed a non-parametric test was appropriate and Kendall's tau was used because it is more appropriate for smaller data sets with large numbers of tied ranks (Field, 2009). As the value for tau, when calculated for the same data, is always lower than Pearson's r, close attention should be paid to the significance level rather than to the value of tau in interpreting the results from this test (Field, 2009).

Table 4.12 Correlations between changes in emissions from recorded energy use and carbon footprint results Kendall's tau

	Change in carbon footprint T1 T2	Change in carbon footprint T2 T3	Change in carbon footprint T1 T3
Change in household energy use (N=21)	**.530****	.063	**.371***
Change in car travel (N=22)	-.065	-.010	.082
Change in air travel (N=22)	-.019	**.711****	**.502***
Change in public travel (N=22)	.114	.120	.244

*** Correlation is significant at the 0.01 level (2-tailed).*
** Correlation is significant at the 0.05 level (2-tailed).*

4.3.6 Pro-environmental behaviour

One of the objectives of this study was to determine whether participants in the Footpaths programme increased their pro-environmental behaviour after participating in Footpaths, and whether any change was durable. Change in behaviour was measured by comparing data on pro-environmental behaviour from pre-group (T1) to immediately post-group (T2). The durability of these changes was also explored by comparing data on pro-environmental behaviour from post-group (T2) to one year after group start (T3), and from T1 to T3.

Frequency of pro-environmental behaviour measure

The frequency of pro-environmental behaviours increased between T1 and T2, and decreased minimally between T2 and T3. Figure 4.5 plots the frequency of behaviour at T1 against frequency of behaviour at T2. In cases falling on the diagonal line frequency of pro-environmental behaviour did not change between T1 and T2. It increased in all cases above the line, and decreased in cases below the line. Figure 4.6 plots the frequency of pro-environmental behaviour at T2 against frequency at T3. Comparing the graphs suggests that frequency of pro-environmental increased for a majority of participants between T1 and T2 while increases and decreases were more evenly distributed between T2 and T3.

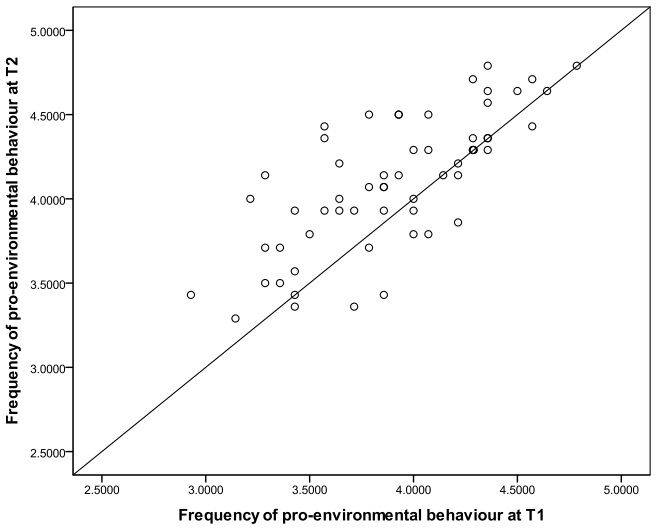


Figure 4.5 Change in frequency of pro-environmental behaviour between T1 and T2.

The diagonal line represents no change of behaviour between T1 and T2.

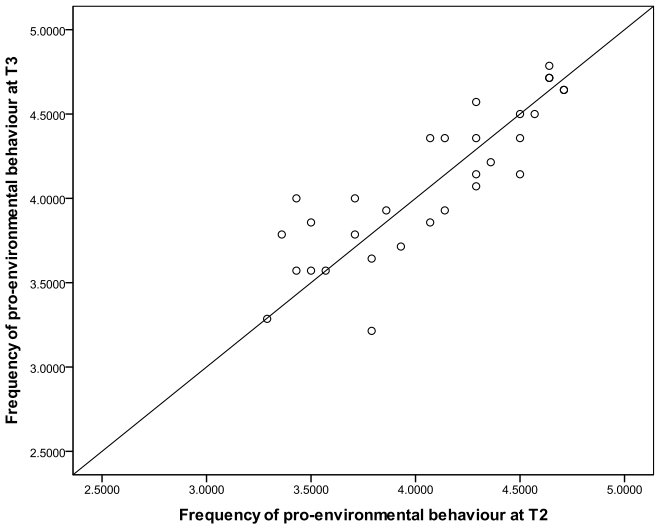


Figure 4.6 Change in frequency of pro-environmental behaviour between T2 and T3.

The diagonal line represents no change of behaviour between T2 and T3.

The mean score for frequency of pro-environmental behaviour at T1 was 3.89 (N = 88, SD =.419), at T2 it was 4.11 (N = 60, SD =.406), and at T3 was 4.09 (N= 31, SD =.435) where 1 was never perform the behaviour and 5 was always perform the behaviour. The distributions for frequency of pro-environmental behaviour were assessed for normality at all three times using the Shapiro-Wilk test and were found to be normal (T1 W (88) =.978, p =.147, T2 W (60) =.968, p =.113, T3 W(31) =.965, p =.391). Paired samples *t*-tests indicate a significant increase between T1 and T2 scores for frequency of pro-environmental behaviours (t (58) = 5.02, p <.001) with a moderate effect size (*d* =.65), a significant increase between T1 and T3 scores for frequency of pro-environmental behaviours, (t (30) = 3.19, p =.003) with a moderate effect size (*d* =.59), and no

significant difference between T2 and T3 scores for frequency of pro-environmental behaviours ($t(30) = .423$, $p = .675$). These findings suggest that the increase in pro-environmental behaviours by Footpaths' participants was both significant and durable.

The changes in frequency of pro-environmental between T1 and T2 were not significantly correlated with any of the socio-demographic characteristics measured (Appendix 6). There was a negative correlation between qualifications and frequency of pro-environmental behaviour between T2 and T3 ($n = 31$, $\tau = -.321$, $p = .024$).

Self-report changes volunteered by participants in answer to open-ended questions

Questionnaires at T2 and T3 also asked participants to volunteer information about any changes they had made to their lifestyles as a result of participating in Footpaths, and any changes they were planning to make. These changes were allocated to one of six categories and each category was divided into behaviour change or physical change, e.g. fitting insulation, purchasing a more efficient vehicle, or fitting water-saving devices (Table 4.13). The majority of actual changes made by participants were changes in behaviour with changes in the area of home energy use, travel and food being mentioned most frequently. These results partially reflect the results of the carbon footprint analysis which showed the largest reductions from water heating, food, and household goods.

Planned changes were evenly divided between behaviour changes and physical changes, with planned behaviour changes mostly in the area of travel and food, again reflecting the important contribution of those areas to reductions in carbon footprint size. Planned changes associated with physical change were mostly related to changes in home energy and included improving insulation, heating systems, windows, and installing renewable energy sources. The greater emphasis on physical change in the planned changes rather than in the actual changes may reflect the longer timescale needed to investigate and install physical changes than to institute changes in behaviour.

Table 4.13 Numbers actual changes made by Footpaths' participants at T2, and changes participants reported intending to make in the future

	Actual changes at T2			Planned changes at T2		
	Behaviour	Physical change	Total	Behaviour	Physical change	Total
Home energy	65	23	88	9	49	58
Travel	44	0	44	20	2	22
Food	39	0	39	22	0	22
Water	25	3	28	1	5	6
Waste	25	0	25	1	4	5
Other	16	0	16	9	0	9
Total	214	26	240	62	60	122

4.3.7 Environmental values and attitudes of participants

For the purpose of this study reasonable behaviour for people with pro-environmental world-view and attitude was operationalised as adopting pro-environmental behaviour. Therefore it was important to establish the degree to which Footpaths' participants had pro-environmental world-views and attitudes before taking part in the programme, and to examine how these related to pro-environmental behaviour.

Pro-environmental world-view

The pro-environmental world-view of participants was assessed using the New Ecological Paradigm (Dunlap *et al.*, 2000). The full 15 item NEP scale was included in questionnaires pre-group (T1) and one year post-group (T3). The NEP is a measure of world-view rather than attitude, and was not expected to change significantly over time. The mean score at T1 was 3.91 (N = 88, SD = 0.435) and at T3 was 4.04 (N = 31, SD = 0.438) where 1 was strongly disagree and 5 was strongly agree with a set of statements about the environment. The distributions for NEP were assessed at both times and were found to be normal (T1 (W(88) =.985, p =.426 T2 , W(31) =.964, p =.371). A paired samples *t*- test indicated that there was no statistically significant difference between T1

and T3 scores (t (30) = -0.585, p =.563) suggesting that pro-environmental world-view did not change after participation in Footpaths.

Pro-environmental attitude

Pro-environmental attitude was explored by asking participants to identify with one of the seven categories defined in DEFRA's "Framework for pro-environmental behaviours" (DEFRA, 2008). The Framework report provides one or two short sentences summarizing the attitude towards the environment typical of each category. These sentences were included in questionnaires at T1 and T3 and participants were asked to indicate the sentence which most closely represented their attitude. Attitude ranged from 1 to 6 where 1 was the most pro-environmental and 7 was the least. It was non-normally distributed with a skewness of 1.31(*SE* =.258) at T1 and a skewness of 1.31 (*SE* =.421) at T3. Kurtosis at T1 was.80 (*SE* -.511) and.848 (*SE* =.821) at T3. A Shapiro-Wilk test confirmed the non-normal distributions at both times (T1, W(87) =.768, p<.001 , T3, W(31) =.710, p <.001). The median score at T1 was 2 (N = 87) and at T3 was 1 (N = 31) t. A related samples Wilcoxon Signed-ranks test indicated that there was no statistically significant difference between T1 and T3 scores (z = -1.90, p =.058) suggesting that pro-environmental attitude did not change after participation in Footpaths.

Relationship of pro-environmental world-view and attitude to pro-environmental behaviour

Pro-environmental world-view and attitude were compared to frequency of pro-environmental behaviour and to carbon footprint at T1 and T3. As most of the variables included were not normally distributed and the sample size was small Kendall's tau was used (Field, 2009). As stated previously (Section 4.5.5) the value for tau, when calculated for the same data, is always lower than Pearson's r and close attention should be paid to the significance level rather than the value of tau in interpreting the results from this test (Field, 2009).

The results are reported in Table 4.14 with the number of participants for each variable included below the diagonal, and the value for tau reported above the diagonal. This analysis revealed a weak negative correlation between NEP and size of carbon footprint

indicating a relationship between stronger pro-environmental world-view and lower carbon footprint. That correlation is stronger at T3 than T1 suggesting that carbon footprint aligns better with world-view after taking part in a Footpaths group. There is a positive correlation between the NEP and frequency of pro-environmental behaviour indicating a relationship between a more pro-environmental world-view and a greater frequency of pro-environmental behaviour. As with the correlation between NEP and carbon footprint, the correlation between NEP and frequency of pro-environmental behaviour is stronger at T3 than at T1.

Table 4.14 Correlations between pro-environmental world-view, pro-environmental attitude, pro-environmental behaviour (PEB), and carbon footprint (CF) using Kendall's tau

							DEFRA Category	
	NEP T1	NEP T3	CF T1	CFT3	PEB T1	PEB T3	T1	T3
NEP T1	1.00	**.601****	**-.196***	**-.263***	**.315****	**.411****	-.147	-.046
NEP T3	*31*	1.00	-.220	**-.365****	**.364****	**.390****	-.196	-.160
CF T1	*82*	*31*	1.00	**.281***	**-.263****	**-.302***	**.232****	.099
CF T3	*29*	*29*	*29*	1.00	**-.334***	**-.480****	.251	.215
PEB T1	*88*	*31*	*82*	*29*	1.00	**.640****	**-.286****	-.151
PEB T3	*31*	*31*	*31*	*29*	*31*	1.00	**-.345***	-.254
DEFRA Category T1	*87*	*30*	*81*	*28*	*87*	*30*	1.00	**.755****
DEFRA Category T3	*31*	*31*	*31*	*29*	*31*	*31*	*30*	1.00

Figures in italics represent sample size for each test
*** Correlation is significant at the 0.01 level (2-tailed).*
** Correlation is significant at the 0.05 level (2-tailed).*

The DEFRA category is correlated with frequency of pro-environmental behaviour, which may indicate a positive relationship between pro-environmental attitude and pro-environmental behaviour. This relationship is stronger at T3 than T1 suggesting that behaviour aligns better with green attitude after taking part in Footpaths. There is a weak positive correlation between DEFRA category and carbon footprint at T1 suggesting a relationship between greener attitudes and lower carbon footprints at T1 but not at T3.

4.3.8 Reasonable Person Model (RPM) measures

One of the research questions addressed by this study was whether the environment provided by group-based interventions facilitates model building, effectiveness and meaningful action. Various measures were used to operationalise RPM associated constructs of understanding, exploration, confusion, overwhelm, confidence, competence, responsibility, frustration and participation. One question included nine statements designed by the researcher to attempt to assess these constructs directly. Participants were asked to indicate how much they agreed with these statements on a scale of 1 to 5 where 1 was "strongly disagree" and 5 was "strongly agree". These nine items and the constructs and domains of the RPM related to them are shown in Table 4.15. Exploratory factor analysis was used to explore whether there was any structure discernible in the responses to these questions, and to determine how to treat these variables in further analysis.

Factor analysis of RPM items

Exploratory factor analysis was used to explore whether the nine items which were designed to assess RPM constructs grouped to reflect the different domains of the model and if possible to reduce the number of variables for further analysis. Factor analysis was chosen as the most appropriate method as the measures being explored were new and the assumption made in principal components analysis that there would not be unique variance seemed unwarranted (Costello and Osborne, 2005). Principal axis factoring was preferred to maximum likelihood as the data were skewed (Costello and Osborne, 2005).

Table 4.15 Questions on RPM themes

Reasonable Person Model Domain	Theme	Item
Model building	Understanding (MB1)	I am not sure what changes it would be possible for me to make to reduce my carbon footprint
	Exploration (MB2)	I can imagine what my life would be like if I reduced my carbon footprint
	Confusion (MB3)	I have a clear idea about what actions to take
Being effective	Overwhelm (EF1)	I feel overwhelmed when I think about changing the way I live
	Confidence (EF2)	I feel helpless when I think about reducing my carbon footprint
	Competence (EF3)	It is difficult to understand how to apply information about reducing my carbon footprint to my daily life
Meaningful action	Responsibility (MA1)	I believe I have a responsibility to reduce my carbon footprint
	Frustration (MA2)	Trying to take action to reduce my carbon footprint is frustrating
	Participation (MA3)	My actions can make a difference to climate change

The nine items related to the RPM were analysed based on the responses of 88 participants at T1. This was an almost 10:1 ratio (participants to items) which is within the range considered reliable (Bryman and Cramer, 2012). Inspection of the correlation matrix revealed some correlations above.3 for all variables; with no correlations exceeding.6, indicating that the variables were correlated but that collinearity was not an issue (Field, 2009). The Kaiser-Meyer-Olkin (KMO) measure of sampling accuracy was .695, which indicates that the sample size is between acceptable and good for factor analysis (Field, 2009). For all variables individually the KMO measure was >.5, indicating sampling adequacy according to Field (2009). Bartlett's Test of Sphericity (χ^2

(36) = 173.49, p <.001) indicates that the data are suitable for factor analysis as the items are correlated to some extent. Although the communalities were lower than the.7 required by Kaiser's criterion (Bryman and Crammer, 2012) communalities were within the.40 to.70 range more common in the social sciences (Costello and Osborne, 2005).

Inspection of the scree plot (Figure 4.7) showed a break of slope at four factors indicating that a three factor solution was appropriate, which was confirmed by the eigenvalues which were above 1 for the first three factors, and below 1 for the fourth factor. To further confirm the number of factors to retain a parallel analysis was conducted to compare the eigenvalues for the factor analysis with those from a randomly generated data set (Watkins, 2000; Watkins, 2006). In this analysis factors are retained if their eigenvalues are higher than the randomly generated eigenvalues. The results are shown in Table 4.16 and support the three factor solution. The three factor solution accounted for 63.3% of the variance, with Factor 1 accounting for 31.84%, Factor 2 accounting for 17.84%, and Factor 3 accounting for 13.35%.

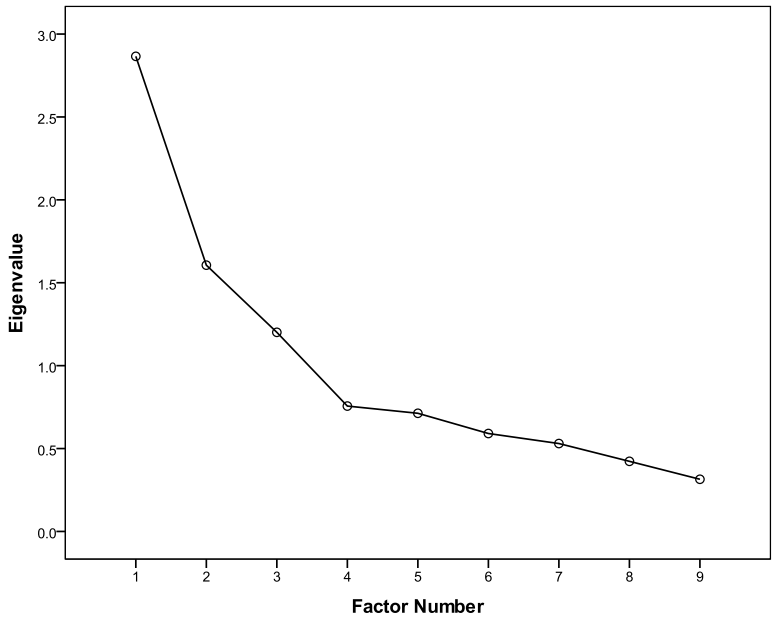


Figure 4.7 Scree plot of factor analysis for RPM items

Table 4.16 Parallel analysis of RPM factor analysis

Factor	Eigenvalue from factor analysis	Eigenvalue from parallel analysis	Decision
1	2.866	1.5117	Accept
2	1.606	1.3143	Accept
3	1.201	1.1922	Accept
4	.756	1.0814	Reject

In the unrotated solution all but two variables, understanding and participation, loaded most strongly on Factor 1, with all three model building factors loading negatively on Factor 2, and participation loading most strongly on Factor 3. Oblique rotation was performed to aid in the interpretation of the three factors. Oblique rather than orthogonal rotation was chosen as the underlying factors were thought to be interrelated as they were all elements of the RPM (Field, 2009). The factor correlation matrix from the oblique rotation indicates that the factors are correlated and therefore that oblique rotation is the most appropriate.

Analysis was conducted with both promax and oblimin rotation with Kaiser normalization and the results from the direct oblimin are reported here (Table 4.17 and Table 4.18). Both methods yielded similar solutions with all three effectiveness variables and frustration loading most strongly on Factor 1, all three model building variables loading most strongly on Factor 2, and responsibility and participation loading most strongly on Factor 3. The analysis was rerun using varimax orthogonal rotation and yielded very similar results, as did a principal components analysis with oblique rotation suggesting that the factors are robust to analytical technique.

Scale reliability for the RPM variables was assessed using the Cronbach's alpha test (Field, 2009) and the results are presented in Table 4.19. Looking at reliability of the scale if the RPM items were treated as one variable, the Cronbach's alpha is acceptable at.720, but examination of the inter-item correlation matrix reveals that participation is weakly negatively correlated with understanding, exploration, and confidence suggesting that it is measuring something different from the rest of the scale. The

Table 4.17 Pattern matrix of RPM items

		Factor Loadings		
		Factor 1	Factor 2	Factor 3
Effectiveness	Overwhelm (EF1)	**.720**		
	Confidence (EF2)	**.706**		
	Competence (EF3)	**.424**		
Model Building	Understanding (MB1)		**-.696**	
	Exploration (MB2)		**-.616**	
	Confusion (MB3)		**-.746**	
Meaningful Action	Responsibility (MA1)			**.358**
	Frustration (MA2)	**.628**		
	Participation (MA3)			**.787**

Extraction Method: Principal Axis Factoring
Rotation Method: Oblim with Kaiser Normalization
Primary loading shown in bold. Loadings.3 or less removed

Table 4.18 Structure matrix of RPM items

		Factor Loadings		
		Factor 1	Factor 2	Factor 3
Effectiveness	Overwhelm (EF1)	**.745**		
	Confidence (EF2)	**.671**		
	Competence (EF3)	**.492**	-.402	
Model Building	Understanding (MB1)		**-.662**	
	Exploration (MB2)		**-.618**	
	Confusion (MB3)		**-.797**	
Meaningful Action	Responsibility (MA1)			**.393**
	Frustration (MA2)	**.637**		.354
	Participation (MA3)			**.771**

Extraction Method: Principal Axis Factoring
Rotation Method: Oblim with Kaiser Normalization
Primary loading shown in bold. Loadings.3 or less removed

average inter-item correlation is.216 which also suggests that there is not a strong relationship between all items.

For the effectiveness factor Cronbach's alpha was.719, which is slightly lower than the alpha for all 9 items but there are no negative inter-item correlations and the average inter-item correlation is.391 suggesting a moderately strong relationship between items on the scale. The model-building factor had an alpha of.723, slightly higher than for the full scale, with an inter-item correlation of.459 again suggesting a moderately strong relationship between items. The meaningful action factor consisted of only two items and had an alpha of.459, with a low inter-item correlation of.298. Because of the low scale reliability for the meaningful action factor the two variables responsibility (MA1) and participation (MA3) were used as separate independent variables in further analysis.

Table 4.19 Scale Reliability for RPM factors

Scale	*n* items	*n* cases	average item inter-correlation	α
All questions	9	88	.216	.720
Effectiveness (EF)	4	88	.391	.719
Model Building (MB)	3	88	.469	.723
Meaningful Action (MA)	2	88	.298	.459

The results from the factor analysis and the scale reliability test suggest that two new variables can be created for effectiveness and model building for use in further analysis. These were computed from the variables which loaded on the two factors effectiveness and model building by taking averaged sum scores for the variables loading on those factors. Tabachnick and Fidell (2001) suggest that this is an acceptable approach for exploratory research.

Changes over time in RPM variables

RPM questions used a response scale of 1 to 5, from strongly disagree to strongly agree. Descriptive statistics for all three times are presented in Table 4.20. Skewness and kurtosis and the results for normality testing using the Shapiro-Wilk test are shown in

Table 4.21. The effectiveness factor showed a normal distribution at all three times, while the model building factor was not normally distributed at T1 and T2, and responsibility and participation were not normally distributed at T1, T2 or T3. The mean values for the effectiveness and model building factors increased from T1 to T2 and again from T2 to T3, while the median for responsibility increased from T1 to T2, but not from T2 to T3, and the median for participation did not change.

Paired sample t-tests indicated that there was a significant difference between the T1 and T2 scores for the effectiveness factor (t (57) = -3.535, p =.001) with a small to moderate effect size (d =.398) and between the T1 and T3 scores (t (30) = -2.631, p =.013) with a moderate effect size (d =.457). The difference between the T2 and T3 scores was not significant (t (29) = -.603, p =.551).

Related samples Wilcoxon Signed-ranks tests indicated that there was a significant difference between the T1 and T2 scores for the model building factor (*z* = - 4.923, *p* <.001) with a moderate to large effect size (*r* =.449) and between the T1 and T3 scores (z = -3.258, p =.001) with a moderate to large effect size (r =.4137). The difference between the T2 and T3 scores was not significant (z = -.077, p =.938).

Table 4.20 RPM variables at T1, T2 and T3

		N	Minimum	Maximum	Mean	Std. Deviation	Median
Effectiveness (RPM factor 1)	T1	88	1.88	5.00	3.29	.688	3.25
	T2	59	2.00	5.00	3.56	.678	3.50
	T3	31	2.50	5.00	3.58	.522	3.75
Model Building (RPM factor 2)	T1	88	1.33	5.00	3.27	.772	3.33
	T2	60	2.00	5.00	4.00	.667	4.00
	T3	31	3.00	5.00	4.04	.563	4.00
Responsibility (MA1)	T1	88	3.00	5.00	4.37	.683	4.00
	T2	60	1.00	5.00	4.55	.675	5.00
	T3	31	3.00	5.00	4.55	.624	5.00
Participation (MA3)	T1	88	2.00	5.00	4.17	.698	4.00
	T2	60	2.00	5.00	4.05	.746	4.00
	T3	31	2.00	5.00	4.10	1.012	4.00

Related samples Wilcoxon Signed-ranks tests indicated that there was a significant difference between the T1 and T2 scores for responsibility (MA1) (z = -7.425, p <.001) with a large effect size (r =.6778). The difference between the T1 and T3 scores was not significant (z = -1.265, p =.206) and neither was the difference between the T2 and T3 scores (z = -.277, p =.782).

Related samples Wilcoxon Signed-ranks tests indicated that there were no significant difference between the scores for participation at any of the times (MA3) (T1 to T2, z = -1.192, p =.233, T1 to T3, z = -1.097, p =.273, T2 to T3, z = -.1.387, p =.166).

These findings suggest that scores for effectiveness and model building increased significantly from before taking part in Footpaths to after taking part in Footpaths, and that these increases were lasting. Scores for responsibility increased significantly from before to after participating in Footpaths, but this change may not have lasted. Scores for participation did not change significantly from before to after participating in Footpaths.

Table 4.21 Results of normality testing for RPM variables

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Effectiveness (RPM factor 1)	T1	88	.257	.257	-.113	.508	.976	88	.098
	T2	59	-.131	.311	-.145	.613	.979	59	.380
	T3	31	-.038	.421	1.08	.821	.937	31	.067
Model building (RPM factor 2)	T1	88	-.296	.257	-.663	.508	.955	88	.004
	T2	60	-3.828	.309	1.04	.608	.931	60	.002
	T3	31	.114	.421	-.519	.821	.940	31	.085
Responsibility (MA1)	T1	88	-1.52	.257	5.42	.508	.708	88	.000
	T2	60	-2.586	.309	11.56	.608	.590	60	.000
	T3	31	-1.075	.421	.220	.821	.693	31	.000
Participation (MA3)	T1	88	-.661	.257	.753	.508	.790	88	.000
	T2	60	-.588	.309	.430	.608	.818	60	.000
	T3	31	-.824	.421	-.428	.821	.804	31	.000

4.3.9 Other measures related to Model Building

Other measures used to attempt to assess improvement in model building in Footpaths' participants included a question assessing improvement in understanding and a question about mindfulness using the Mindfulness Attention Awareness Scale (K. W. Brown and Ryan, 2003b).

Understanding

The question assessing understanding showed a change in relative importance of different actions in reducing carbon footprint between T1 and T2. Participants were asked to indicate which three actions from a list of seven actions would make the biggest difference to the average household in the UK. Table 4.22 shows the actual reduction in CO_2 emissions calculated for a number of lifestyle changes. The percentage of participants ascribing importance to the different changes at T1 and T2 is shown in the third and fourth columns. After participation in Footpaths respondents were able to identify more accurately the most important actions for reducing CO_2 emissions

Table 4.22 Percent of participants listing action among 3 most important for reducing the carbon footprint of the average UK household

	Actual reduction in CO_2 emissions as a result of taking action (DEFRA, 2008)	T1 percent listing among top three actions	T2 percent listing among top three actions
Reduce short haul flights	1,120	47.1	66.0
Install insulation	750	71.2	54.5
Use car less	750	72.4	53.3
Adopt a vegetarian diet	630	31.0	52.5
Waste less food	600	36.8	23.3
Install renewable energy	350	32.2	38.2
Limit water use	140	9.1	9.9

Mindfulness

Mindfulness was measured using the Mindfulness Attention Awareness Scale (MAAS) (K. W. Brown and Ryan, 2003b). Mindfulness was measured by asking participants to indicate how frequently they had a particular experience in their everyday lives on a scale of 1 to 6 with 1 being "almost never", and 6 being "almost always". The Cronbach's alpha for the MAAS was.878 with an average inter-item correlation of.323. All items were positively correlated. Mindfulness reduced slightly between T1 and T2, and increased between T2 and T3 (Table 4.23). Examination of skewness and kurtosis indicated that mindfulness was not normally distributed at T1 or T2 which was confirmed with a Shapiro-Wilk test (Table 4.24).

Table 4.23 Descriptive statistics for Mindfulness at T1, T2, and T3

		N	Minimum	Maximum	Mean	Std. Deviation	Median
Mindfulness	T1	88	1.067	5.200	2.804	.679	2.733
	T2	60	2.000	4.733	2.771	.525	2.667
	T3	30	1.800	4.133	2.804	.575	2.800

Table 4.24 Tests for normality for Mindfulness at T1, T2 and T3

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Mindfulness	T1	88	.178	.257	1.695	.508	.969	88	.031
	T2	60	1.505	.309	3.810	.608	.887	60	.000
	T3	30	.262	.427	-.245	.833	.979	30	.812

Related samples Wilcoxon Signed-ranks tests indicated that there was not a significant difference between T1 and T2 (Z = -.394, p =.694, r = 0.051), between T1 and T3 (z =.001, p= 1.00, r = 0) or between T2 and T3 (z= -7.25, p =.468, r = -1.324). This indicates that there was no significant change in mindfulness after participating in Footpaths.

4.3.10 Other measures related to effectiveness

Two measures were used to attempt to operationalise the confidence and the competence aspects of the effectiveness domain of the RPM, self-efficacy and perceived ease. Self-efficacy scales are commonly used to assess confidence (Bandura, 2005) and competence was assessed using a perceived ease scale developed by the 21st Century Home study (Gatersleben *et al.*, 2009).

Self-efficacy

Eight questions were devised by the researcher to form a self-efficacy scale for pro-environmental behaviour following the procedure outlined by Bandura (2005). Participants were asked how confident they were to perform a particular task and responses ranged from 1 to 10 where 1 was "cannot do at all" and 10 was "highly confident can do".

Exploratory factor analysis was conducted to examine whether the items seemed to reflect different aspects of self-efficacy in pro-environmental behaviour. Principal axis factor analysis was again chosen for the reasons outlined previously, and the eight items of the self-efficacy scale were analysed based on the 88 responses at T1, giving a ratio of 11:1 participants to items. Inspection of the correlation matrix revealed some correlations above.3 for all variables, with no correlations exceeding.7, indicating that the variables were correlated but that collinearity was not an issue (Field, 2009). The Kaiser-Meyer-Olkin (KMO) measure of sampling accuracy was.741, which indicates a good sample size for factor analysis (Field, 2009). Bartlett's Test of Sphericity (χ^2 (28) = 259.217.49, p <.001) indicates that the data were suitable for factor analysis as there is some degree of correlation between items. Although the communalities were lower than the.7 required by Kaiser's criterion (Bryman and Crammer 2012, p.328) communalities were within the.40 to.70 range more common in the social sciences (Costello and Osborne, 2005)

Inspection of the scree plot (Figure 4.8) shows a break of slope at two factors indicating that a one factor solution is appropriate, although the eigenvalues for the first and second factors were both above 1. The eigenvalues for the factor analysis were then compared with those from a randomly generated data set to determine how many factors to retain (Watkins, 2000; Watkins, 2006). Only the eigenvalue for factor 1 was higher

than the eigenvalues from a randomly generated data set supporting the one factor solution (Table 4.25). The first factor accounted for 44.97% of the variance. Furthermore when trying to extract a second factor SPSS terminated the extraction due to the communalities exceeding 1. These all suggest that there is only one factor in the self-efficacy scale.

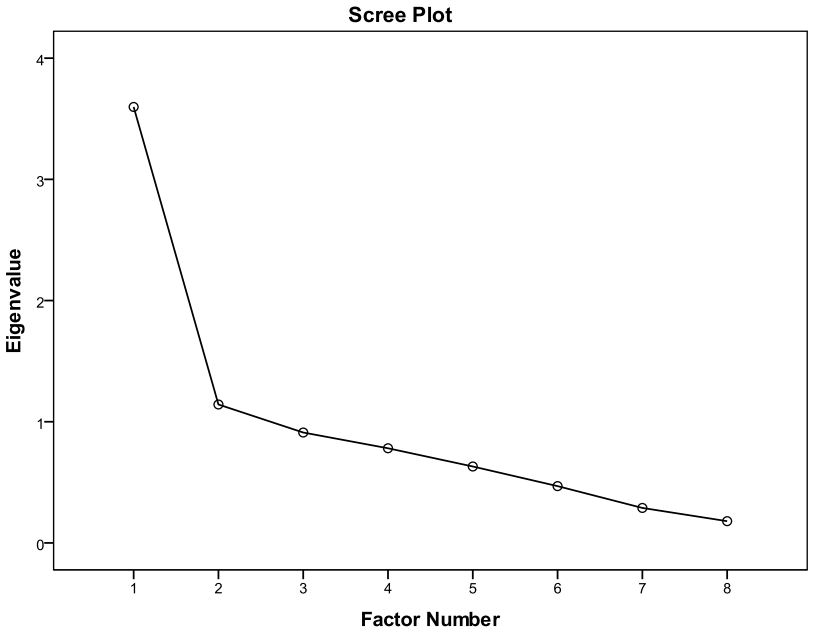


Figure 4.8 Scree plot of self-efficacy questions

Table 4.25 Parallel analysis of factor analysis of self-efficacy questions

Factor	Eigenvalue from factor analysis	Eigenvalue from parallel analysis	Decision
1	3.597	1.4685	Accept
2	1.142	1.2706	Reject

The Cronbach's alpha for the self efficacy scale is. 808 and examination of the inter-item correlation matrix reveals that all the items are positively correlated with an average inter-item correlation of 0.345. The results of the factor analysis and of the scale reliability test indicate that the self-efficacy questions can be treated as a single item in further analysis.

Changes over time for self-efficacy

Self-efficacy increased between T1 and T2 and decreased between T2 and T3 (Table 4.26). Examination of skewness and kurtosis indicated that self-efficacy was normally distributed at all three times, which was confirmed using the Shapiro-Wilk test (Table 4.27).

Table 4.26 Descriptive statistics for self-efficacy

		N	Minimum	Maximum	Mean	Std. Deviation	Median
Self-efficacy	T1	87	3.00	9.40	6.139	1.403	6.300
	T2	60	3.90	9.40	6.640	1.341	6.500
	T3	31	2.00	9.70	6.511	1.888	6.200

Table 4.27 Normality testing for self-efficacy

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Self-efficacy	T1	87	-.301	.258	-.339	.511	.981	87	.239
	T2	60	.101	.309	-.714	.608	.980	60	.409
	T3	31	-.240	.421	-.364	.821	.975	31	.654

Paired sample t-tests indicate a significant difference between T1 and T2 scores for self-efficacy ($t(57) = -3.013$, $p = .004$, $d = .36$) with a small to moderate effect size ($d = .36$) and between T1 and T3 ($t(30) = -2.393$, $p = .023$, $d = .286$) with a small effect size ($d = .286$) but not between T2 and T3 ($t(30) = .147$, $p = .884$). This suggests that self-efficacy increased after participating in Footpaths, and that this increase was lasting.

Perceived ease

Perceived ease was measured using a list of 20 items developed for the 21st Century Home study (Gatersleben *et al.*, 2009). The Cronbach's alpha was.783 with an average inter-item correlation of.162. Perceived ease was measured by asking participants how difficult they thought it would be to perform particular tasks on a scale of 1 to 6 where 1 was "very difficult to do" and 6 was "already doing". Scores increased (indicating that

respondents found it easier to perform pro-environmental behaviours) from T1 to T2, and from T2 to T3 (Table 4.28).

Examination of skewness and kurtosis suggested that the distribution of perceived ease was normal at all three times which was confirmed using the Shapiro-Wilk test (Table 4.29).

Table 4.28 Descriptive statistics for perceived ease

		N	Minimum	Maximum	Mean	Std. Deviation	Median
Perceived ease	T1	88	1.900	5.450	3.969	.7189	4.050
	T2	60	2.550	5.650	4.240	.772	4.300
	T3	31	2.400	5.750	4.249	.963	4.300

Table 4.29 Normality testing for perceived ease

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Perceived ease	T1	88	-.285	.257	.448	.508	.976	88	.108
	T2	60	-.354	.309	-.504	.608	.974	60	.220
	T3	31	-.269	.421	-.887	.821	.957	31	.236

Paired t-tests indicated that there was a significant increase in perceived ease scores between T1 and T2 ($t(58) = -3.784$, $p < .001$) with a moderate effect size ($d = .498$) and between T1 and T3 ($t(30) = -2.689$, $p = .012$) with a moderate effect size ($d = .505$) indicating an increase in competence. There was not a significant difference between T2 and T3 ($t(30) = -.213$, $p = .833$). These findings suggest that perceived ease increased after participating in Footpaths and that this increase was lasting.

4.3.11 Other measures related to meaningful action

Two questions were included at T1, T2 and T3 to try to directly assess feelings of responsibility in tackling climate change and belief in the importance of individual action. The importance of individual action was explored by asking participants to

indicate on a scale of 1 to 5 how important they thought the role of various actors was in tackling climate change where 1 was “not at all important” and 5 was “very important”. Responsibility was investigated using a 1 to 5 response scale to the question “How much responsibility should the following take for tackling climate change” where 1 was “none” and 5 was “all”. Both these questions asked about government, businesses, communities, and individuals.

Table 4.30 Descriptive statistics for individual responsibility and individual action

		N	Minimum	Maximum	Mean	Std. Deviation	Median
Importance	T1	87	2	5	4.69	.670	5
	T2	60	3	5	4.80	.480	5
	T3	31	2	5	4.61	.761	5
Responsibility	T1	88	2	5	4.01	.652	4
	T2	60	3	5	4.03	.520	4
	T3	31	3	5	4.00	.365	4

Table 4.31 Normality testing for individual responsibility and individual action

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Importance	T1	87	-2.390	.258	5.600	.511	.525	87	.000
	T2	60	-2.434	.309	5.441	.608	.466	60	.000
	T3	31	-2.109	.421	4.143	.821	.581	31	.000
Responsibility	T1	88	-.266	.257	.250	.508	.795	88	.000
	T2	60	.051	.309	.917	.608	.695	60	.000
	T3	31	.000	.421	5.837	.821	.505	31	.000

The belief in the importance of individual action and individual responsibility both increased slightly between T1 and T2 and decreased between T2 and T3 (Table 4.30).

Examination of skewness and kurtosis suggests that neither individual action nor individual responsibility are normally distributed at T1, T2 or T3. This was confirmed using a Shapiro-Wilk test (Table 4.31).

The results of Wilcoxon Signed-ranks tests indicated that there was not a statistically significant difference in responses across the three times to questions on personal responsibility (T1 to T2, z = -.471, p =.637, T1 to T3, z = -1.265, p =.206, T2 to T3, z = -.302, =.763) or on importance of actions by individuals in tackling climate change, (T1 to T2, z = -1.615, p =.106, T1 to T3, z = -.277, p =.782, T2 to T3, -1.155, p =.248). These findings suggest that feelings of personal responsibility and the importance of individual action did not change from before to after participating in Footpaths, possibly due to the scores at T1 being highly skewed and therefore masking any increase in scores for these items.

4.3.12 Correlations between measures related to the RPM

The relationships between the measures related to the RPM were explored at T1, T2 and T3 to see whether any of the measures were correlated, and particularly to determine whether any of the measures designed to assess one domain of the RPM were associated with other measures designed to assess the same domain (Tables 4.32, 4.3.3, and 4.34). As most of the variables included were not normally distributed and the sample size was small Kendall's tau was used (Field, 2009). As stated previously (Section 4.5.5) the significance level rather than the value of tau is important in interpreting the results from this test (Field, 2009). The number of participants for each variable is included below the diagonal in each table, and the value for tau is reported above the diagonal.

Table 4.32 Correlation between RPM measures at T1 using Kendall's tau

	Model Building		Effectiveness			Meaningful Action			
	RPM model building	Mindfulness	RPM effectiveness	Perceived ease	Self-efficacy	RPM responsibility	Individual responsibility	RPM participation	Individual action
RPM model building	1.00	.003	**.221****	.057	**.261****	**.241****	-.098	.003	.086
Mindfulness	*88*	1.00	-.149	-.146	-.106	.011	-.167	-.009	-.133
RPM effectiveness	*88*	*88*	1.00	.061	.132	**.257****	.000	.099	.163
Perceived ease	*88*	*88*	*88*	1.00	**.384****	.154	.133	.150	**.238****
Self-efficacy	*87*	*87*	*87*	*87*	1.00	**.197***	.158	.032	**.227****
RPM responsibility	*88*	*88*	*88*	*88*	*88*	1.00	.041	**.263****	**.207***
Individual responsibility	*88*	*88*	*88*	*88*	*88*	*88*	1.00	.063	**.358****
RPM participation	*88*	*88*	*88*	*88*	*88*	*88*	*88*	1.00	**.363****
Individual action	*87*	*87*	*87*	*87*	*87*	*87*	*87*	*87*	1.00

Figures in italics represent sample size for each test

** Correlation is significant at the 0.05 level (2-tailed).*
*** Correlation is significant at the 0.01 level (2-tailed).*

Table 4.33 Correlation between RPM measures at T2 using Kendall's tau

	Model Building		Effectiveness			Meaningful Action			
	RPM model building	Mindfulness	RPM effectiveness	Perceived ease	Self-efficacy	RPM responsibility	Individual responsibility	RPM participation	Individual action
RPM model building	1.000	.009	**.411****	**.267****	**.289****	**.239***	.004	**.418****	**.239***
Mindfulness	*60*	1.00	-.164	-.203*	-.159	.025	-.123	.007	-.002
RPM effectiveness	*59*	*59*	1.00	.146	**.234***	.128	-.135	.204	.169
Perceived ease	*60*	*60*	*59*	1.00	**.438****	.105	.176	**.293****	**.223***
Self-efficacy	*60*	*60*	*59*	*60*	1.00	.111	.108	**.280****	.089
RPM responsibility	*60*	*60*	*59*	*60*	*60*	1.00	-.136	**.408****	.180
Individual responsibility	*60*	*60*	*59*	*60*	*60*	*60*	1.00	.182	**.359****
RPM participation	*60*	*60*	*59*	*60*	*60*	*60*	*60*	1.00	**.428****
Individual action	*60*	*60*	*59*	*60*	*60*	*60*	*60*	*60*	1.00

Figures in italics represent sample size for each test

** Correlation is significant at the 0.05 level (2-tailed).*

*** Correlation is significant at the 0.01 level (2-tailed*

Table 4.34 Correlation between RPM measures at T3 using Kendall's tau

	Model Building		Effectiveness			Meaningful Action			
	RPM model building	Mindfulness	RPM effectiveness	Perceived ease	Self-efficacy	RPM responsibility	Individual responsibility	RPM participation	Individual action
RPM model building	1.000	-.178	.185	.150	-.038	.116	-.229	.213	.193
Mindfulness	*31*	1.00	-.013	**-.288***	-.160	-.127	**.460****	-.036	-.246
RPM effectiveness	*30*	*30*	1.00	.012	.056	.051	.529	.307	.056
Perceived ease	*31*	*30*	*31*	1.00	.002	.003	.747	.040	.002
Self-efficacy	*31*	*30*	*31*	*31*	1.00	.035	.303	.001	.006
RPM responsibility	*31*	*30*	*31*	*31*	*31*	1.00	.000	**.447****	**.448****
Individual responsibility	*31*	*30*	*31*	*31*	*31*	*31*	1.00	.063	.000
RPM participation	*31*	*30*	*31*	*31*	*31*	*31*	*31*	1.00	**.540****
Individual action	*31*	*30*	*31*	*31*	*31*	*31*	*31*	*31*	1.00

Figures in italics represent sample size for each test

** Correlation is significant at the 0.05 level (2-tailed).*

*** Correlation is significant at the 0.01 level (2-tailed)*

Model building was positively correlated with the other RPM factor, effectiveness, as well as self-efficacy and responsibility at T1, and with effectiveness, perceived ease, self-efficacy, responsibility, participation and individual action at T2. Model building was not significantly correlated with any other measures at T3. There was no significant correlation between model building and mindfulness as expected by the study design.

Effectiveness was positively correlated with the other RPM factor, model building, as well as responsibility at T1, and with model building and self-efficacy at T2. It was not correlated with any other RPM measures at T3. Effectiveness was expected to be related to both self-efficacy and perceived ease, but was associated only with self-efficacy and only at T2.

At T1 self-efficacy was positively correlated with model building, perceived ease, responsibility and individual action and at T2 it was correlated with model building, effectiveness, perceived ease and participation. Self-efficacy was expected to be related to both effectiveness and perceived ease. It was associated with perceived ease at both T1 and T2, suggesting that confidence and perceived ease are related, but only with effectiveness at T2.

Perceived ease was positively correlated with self-efficacy and individual action at T1 and with model building, self-efficacy, participation and individual action at T2. Perceived ease was expected to be related to effectiveness and self-efficacy. It was significantly correlated with self-efficacy at T1 and T2, but only with effectiveness at T1.

At T1 RPM responsibility was positively correlated with model building, effectiveness, self-efficacy, RPM participation and individual action, but not with individual responsibility. At T2 responsibility was correlated with model building and participation and at T3 with participation and individual action. RPM responsibility was expected to be correlated with individual responsibility but was not. It was also expected to be correlated with RPM participation as both are constructs within the RPM domain of meaningful action, but there were no significant correlations between these two measures.

Individual responsibility was correlated only with individual action at T1 and T2, and with mindfulness, participation and individual action at T3. Individual responsibility was expected to be associated with RPM responsibility.

RPM participation was positively correlated with RPM responsibility and individual action at T1, and with model building, perceived ease, self-efficacy, RPM responsibility and individual action at T2. At T3 it was correlated with responsibility and individual action. It was expected to be associated with individual action and it was significantly correlated with individual action at all three times.

Individual action was correlated with perceived ease, self-efficacy, RPM responsibility, individual responsibility, and RPM participation at T1, and with model building, perceived ease, individual responsibility, and participation at T2. At T3 it was correlated with responsibility and RPM participation. Individual action was expected to be associated with RPM participation and it was significantly correlated with RPM participation at all three times.

4.3.13 Correlations between changes in RPM measures

The relationships between changes in measures were also explored to see whether there was any correlation between changes in measures, and particularly whether the changes in measures selected to assess one domain of the RPM were associated with each other. Only those measures which showed significant changes from T1 to T2 or from T1 to T3 were included in the analysis (Tables 4.35 and 4.36). Kendall's tau was used to determine correlation and, as stated previously (Section 4.5.5), the significance level rather than the value of tau should be considered in interpreting the results from this test as the value of tau is lower than the value of Pearson's r when calculated for the same set of data (Field, 2009).

Change from T1 to T2 for the model building factor is significantly correlated with changes in both the effectiveness factor and self-efficacy. Change in self-efficacy is also significantly correlated with change in the effectiveness factor from T1 to T2. A relationship between change in self-efficacy and change in the effectiveness factor was expected as it was suggested that self-efficacy was related to effectiveness. The

Table 4.35 Correlations in changes from T1 to T2 using Kendall's tau

	Effectiveness			Model Building	Responsibility
	Self-efficacy	Perceived ease	RPM Factor Effectiveness	RPM Factor Model Building	RPM Responsibility
Self-efficacy	1.000	.139	**.202***	**.246****	.022
Perceived ease	*58*	1.000	-.010	.142	.047
RPM Factor Effectiveness	*58*	*59*	1.000	**.294****	.136
RPM Factor Model Building	*58*	*59*	*58*	1.000	.117
RPM Responsibility	*58*	*59*	*58*	*59*	1.000

Figures in italics represent sample size for each test
** Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed)*

Table 4.36 Correlations between changes from T1 to T3 using Kendall's tau

	Effectiveness			Model Building
	Self-efficacy	Perceived ease	RPM Factor Effectiveness	RPM Factor Model Building
Self-efficacy	1.000	**.364****	.136	.208
Perceived ease	*31*	1.000	.214	.135
RPM Factor Effectiveness	*31*	*31*	1.000	-.021
RPM Factor Model Building	*31*	*31*	31	1.000

Figures in italics represent sample size for each test
**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed)*

significant correlation between changes in model-building and effectiveness was also expected as they both represent domains of the RPM and therefore would be expected to be associated in a supportive environment.

The only significant correlation in changes from T1 to T3 was between self-efficacy and perceived ease. A relationship between changes in these two measures was expected as it was suggested that they both were associated with effectiveness.

4.3.14 Correlations between RPM measures and pro-environmental behaviour

The relationships between RPM measures and frequency of pro-environmental behaviour and carbon footprint at T1, T2 and T3 were also explored to determine whether pro-environmental behaviour and carbon footprint size were related to any of the RPM measures before or after participation in a Footpaths group (Tables 4.37, 4.38.and 4.39). Correlations were determined using Kendall's tau. As stated previously (Section 4.5.5), attention should be paid to the significance level rather than the value of tau in interpreting the results from this test (Field, 2009).

Self-efficacy and perceived ease were significantly positively correlated with frequency of pro-environmental behaviour at all three times, suggesting that those who were more confident of their ability and/or found it easier to perform pro-environmental behaviours were likely to do so. Self-efficacy was significantly negatively correlated with size of carbon footprint at T2 and T3, suggesting that those who felt more confident to perform pro-environmental behaviours were more likely to have smaller carbon footprints.

Perceived ease was significantly negatively correlated with size of carbon footprint at all three times suggesting that those who thought it was easier to perform pro-environmental behaviours were more likely to do so. Neither model building nor effectiveness was significantly correlated with behaviour or carbon footprint size at any

Table 4.37 Correlations between RPM measures and frequency of pro-environmental behaviour and carbon footprint at T1 using Kendall's tau (N=88)

		Pro-environmental behaviour	Carbon Footprint
Effectiveness	RPM Effectiveness	-.033	-.025
	Self-efficacy	**.397****	-.059
	Perceived ease	**.371****	**-.235****
Model Building	RPM Model Building	.102	-.029
	Mindfulness	-.124	-.062
Meaningful Action	RPM Responsibility	**.242****	-.168
	RPM Participation	.099	-.055
	Individual Responsibility	.052	.099
	Individual Action	.133	-.100

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

Table 4.38 Correlations between RPM measures and pro-environmental behaviour and carbon footprint at T2 using Kendall's tau (N=60)

		Pro-environmental behaviour	Carbon Footprint
Effectiveness	RPM Effectiveness	.044	-.012
	Self-efficacy	**.338****	**-.220****
	Perceived ease	**.433****	**-.352****
Model Building	RPM Model Building	.018	-.151
	Mindfulness	-.178	.011
Meaningful Action	RPM Responsibility	.183	**-.225***
	RPM Participation	**.226***	**-221****
	Individual Responsibility	103	.026
	Individual Action	.095	-.024

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

Table 4.39 Correlations between RPM measures and pro-environmental behaviour and carbon footprint at T3 using Kendall's tau (N=31)

		Pro-environmental behaviour	Carbon Footprint
Effectiveness	RPM Effectiveness	.097	-.021
	Self-efficacy	**.470****	**-.337***
	Perceived ease	**.509****	**-.400****
Model Building	RPM Model Building	.148	-.073
	Mindfulness	**-.279***	.126
Meaningful Action	RPM Responsibility	**.384***	**-.557****
	RPM Participation	.223	**-.325***
	Individual Responsibility	-.009	-.204
	Individual Action	.250	-.263

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

of the three times. RPM responsibility was significantly positively correlated with frequency of behaviour at T1 and T3 and negatively correlated with size of carbon footprint at T2 and T3 suggesting that those who felt more responsible for the environmental impact of their lives were more likely to perform more pro-environmental behaviours and to have lower carbon footprints. RPM participation was significantly negatively correlated with size of carbon footprint at T3 suggesting that those who felt that their actions were important were more likely to have lower carbon footprints.

4.3.15 Correlations between RPM measures and changes in behaviour

Statistical testing indicated that there were significant changes in frequency of pro-environmental behaviour and in size of carbon footprints over time (sections 4.5.4 and 4.5.5). There were also significant increases in the measures related to the RPM: model building, effectiveness, responsibility, confidence, and perceived ease (section 4.6). Bi-variate correlation was used to investigate whether changes in pro-environmental behaviour, as measured by frequency of pro-environmental behaviour and size of carbon footprint, were associated with changes in measures related to the RPM. Firstly,

change scores were calculated for these variables by subtracting values at T2 and T3 from values at T1 and values at T3 from values at T2. These change scores are presented in Table 4.40 and the results for normality tests are shown in Table 4.41. Change scores were only calculated for those differences which were shown to be statistically significant in previous tests (see Section 4.9.2). Kendall's tau was used to determine correlation. The significance level rather than the value of tau should be considered in interpreting the results from this test (Field, 2009).

Table 4.40 Change scores for changes in variables from T1 to T2, T2 to T3 and T1 to T3. [1]

		N	Min	Max	Mean	Std. Deviation	Median
Change in Carbon Footprint	T1 to T2	60	-4.70	14.87	1.058	3.116	.390
	T2 to T3	27	-5.26	8.56	.5126	2.737	.160
	T1 to T3	29	-6.82	10.63	1.200	3.526	.420
Change in frequency of pro-environmental behaviour	T1 to T2	59	-.43	.86	.194	.296	.211
	T2 to T3	31	-.86	.71	.170	.297	.142
	T1 to T3	31	-.57	.58	-.018	.240	-.001
Change in RPM effectiveness factor	T1 to T2	58	-1.50	2.00	.312	.675	.250
	T1 to T3	31	-1.00	2.00	.330	.699	.250
Change in RPM model building factor	T1 to T2	59	-1.00	3.00	.694	.891	.666
	T1 to T3	31	-1.00	2.67	.583	.845	.333
Change in RPM responsibility variable	T1 to T2	59	-3.00	1.00	.118	.696	.000
Change in self-efficacy	T1 to T2	58	-2.00	4.80	.569	1.439	.500
	T1 to T3	31	-1.80	3.40	.608	1.414	.400
Change in perceived ease	T1 to T2	59	-1.05	1.80	.268	.545	.250

[1] *Change scores are only included for time points where the difference in scores have been shown to be statistically significant.*

Table 4.41 Normality testing for change scores

		N	Skewness	Std. error of skewness	Kurtosis	Std. error of kurtosis	W	df	p
Change in Carbon Footprint	T1 to T2	60	1.96	.309	6.41	.608	.793	60	.000
	T2 to T3	27	.770	.448	2.09	.872	.950	27	.213
	T1 to T3	29	.581	.434	1.22	.845	.949	29	.169
Change in frequency of pro-environmental behaviour	T1 to T2	59	.319	.311	-.061	.613	.973	59	.210
	T2 to T3	31	-1.14	.421	3.84	.821	.911	31	.014
	T1 to T3	31	-.032	.421	.470	.821	.982	31	.874
Change in RPM effectiveness factor	T1 to T2	58	.017	.314	.654	.618	.977	58	.346
	T1 to T3	31	.553	.421	-.149	.821	.952	31	.174
Change in RPM model building factor	T1 to T2	59	.551	.311	.294	.613	.949	59	.015
	T1 to T3	31	.451	.421	-.151	.821	.967	31	.435
Change in RPM responsibility variable	T1 to T2	59	-1.430	.311	5.875	.613	.716	59	.000
Change in self-efficacy	T1 to T2	58	.567	.314	.213	.618	.973	58	.212
	T1 to T3	31	.241	.421	-.924	.821	.960	31	.285
Change in perceived ease	T1 to T2	59	.189	.311	.771	.613	.985	59	.662
	T1 to T3	31	-.606	.421	2.096	.821	.959	31	.275

Table 4.42 Correlation of change scores between pro-environmental behaviours and psychological measures using Kendall's tau

	RPM Effectiveness Change T1 T2	Self Efficacy Change T1 T2	Perceived ease Change T1 T2	RPM Model Building Change T1 T2	RPM Responsibility Change T1 T2	RPM Effectiveness Change T1 T3	Self Efficacy Change T1 T3	Perceived ease Change T1 T3	RPM Model Building Change T1 T3
Carbon footprint change in tonnes of CO_2 T1 T2	-.154	-.007	.014	-.117	.040	.094	.069	-.030	-.003
N	55	55	56	56	56	29	29	29	29
Carbon footprint percent change T1 T2	-.163	-.010	.027	-.146	-.001	.146	.089	.000	-.018
N	55	55	56	56	56	29	29	29	29
Change in frequency of pro-environmental behaviour T1 T2	.124	**.239****	.064	.167	.097	.143	.221	.220	**.278***
N	58	58	59	59	59	31	31	31	31
Carbon footprint change in tonnes of CO_2 T1 T3	.194	.032	-.012	**.299***	-.100	**.371****	.256	**.365****	.128
N	28	29	29	29	29	29	29	29	29
Carbon footprint percent change T1 T3	.211	.032	-.012	**.299***	-.114	**.361****	**.266***	**.365****	.118
N	28	29	29	29	29	29	29	29	29
Change in frequency of pro-environmental behaviour T1 T3	-.120	.133	.191	.204	.075	.104	.154	.159	**.278***
N	30	31	31	31	31	31	31	31	31

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

The correlation between the changes in frequency of pro-environmental behaviour and the size of carbon footprint and the changes in RPM measures are presented in Table 4.42. Both actual change scores and percent change scores were included for carbon footprint as the initial variation in carbon footprint size among participants was very large. The correlations between the actual change and percent change scores for carbon footprint size with other measures are very similar, but the percent change may be a better reflection of the degree of change as those with smaller carbon footprints have less potential for footprint reduction (Table 4.42). As stated previously (Section 4.5.5) the value for tau, when calculated for the same data, is always lower than Pearson's r and close attention should be paid to the significance level rather than the value of tau in interpreting the results from this test (Field, 2009).

There were no significant correlations between change in carbon footprint and change in the model building or effectiveness factors between T1 and T2, but there was a significant correlation between change in the RPM model building factor from T1 to T2 and change in carbon footprint from T1 to T3. This may suggest that changes in model building are followed by changes in behaviour. There were significant correlations between changes from T1 to T3 in the effectiveness factor, self-efficacy and perceived ease and change in carbon footprint from T1 to T3.

There is a significant correlation between the model building factor from T1 to T3 and increases in pro-environmental behaviour both between T1 and T2 and between T1 and T3. Change in self-efficacy from T1 to T2 is significantly correlated with increase in frequency of pro-environmental behaviour between T1 and T2.

Of the four measures used to assess meaningful action only responsibility showed a significant change between T1 and T2, and none of the measures showed a significant change from T1 to T3. There were no significant correlations between change in responsibility between T1 and T2 and changes in frequency of pro-environmental behaviour or size of carbon footprint between T1 and T2 or between T2 and T3.

4.4 Discussion of Quantitative Results

The implications of the analyses above for the research questions listed at the beginning of the chapter are discussed here by question. First, however, the characteristics of the participants before taking part in Footpaths are reviewed and compared with the general population to determine whether particularism is an issue for the Footpaths programme as it is for other group-based interventions promoting pro-environmental behaviour.

4.4.1 Baseline measures for participants

Socio-demographics

Analysis of the socio-demographic data suggested that Footpaths' participants were largely similar to the general population of Leicester except that women were over-represented and Footpaths' participants were much more likely to hold qualifications at degree level or higher (Table 4.5). The higher than average educational attainment of Footpaths' participants is in line with evidence that the UK climate action movement is largely comprised of university educated individuals and that concern about environmental issues is often related to higher levels of education (Howell, 2012).

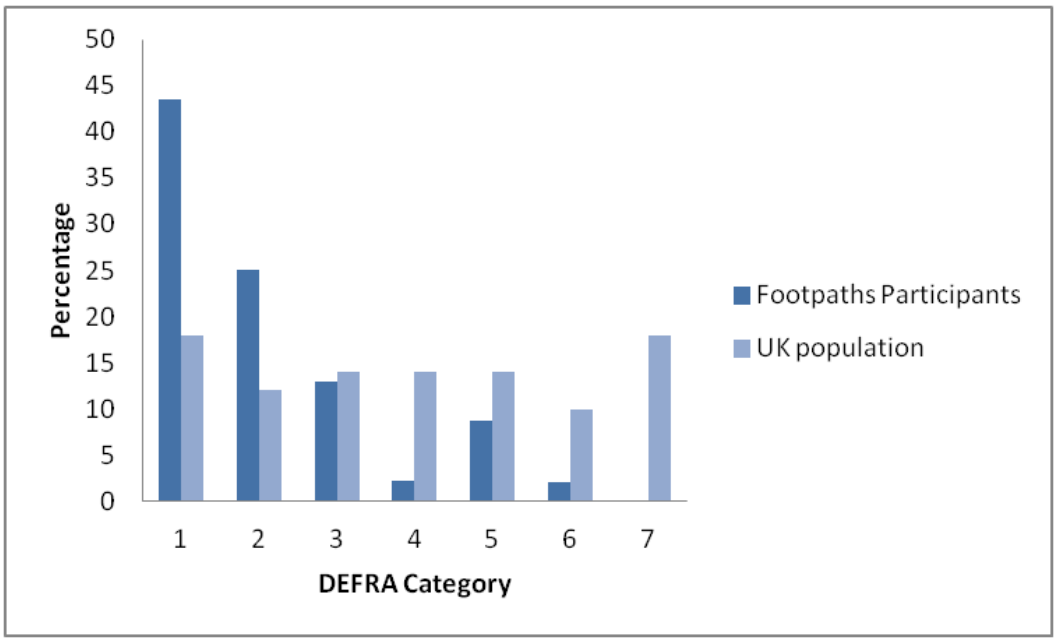
World-view and attitude

The mean NEP score for Footpaths' participants was 3.91 before starting Footpaths, and did not change significantly. This score indicates a stronger than average pro-environmental world-view compared to a mean score of 3.06 from a representative survey of UK residents in 2009 using a shortened version of the NEP (Thornton, 2009) and a mean score of 3.50 from a sample of about 300 University employees in Leicester (Carl Holland personal communication). A study of University students in the UK found a mean NEP score 4.22 for 45 students who were actively involved with environmental issues and a mean NEP score of 3.31 for 45 students drawn from the general population (Pahl, Harris, Todd, and Rutter, 2005), suggesting that the environmental view of Footpaths' participants is closer to that of environmental activists than to that of non-activists.

Pro-environmental attitude was explored by asking participants to identify with one of the seven categories defined in DEFRA's "Framework for pro-environmental

behaviours" (DEFRA, 2008). The distribution of attitude among the Footpaths' participants was very different from that among the UK population (DEFRA 2008) (Figure 4.9). A large proportion of Footpaths' participants were in the two most pro-environmental categories compared to the general population, and there were fewer Footpaths' participants in the less pro-environmental categories. Pro-environmental attitude did not change significantly after participating in Footpaths.

Figure 4.9 Comparison of pro-environmental attitude between Footpaths' participants and the UK population



Pro-environmental behaviour

The mean score for the frequency of pro- environmental behaviour before taking part in Footpaths does not differ significantly from that of the general UK population. The mean score for frequency of pro-environmental behaviour for Footpaths' participants was 3.89 where 1 is never perform the behaviour and 5 is always perform the behaviour. The mean score for the same 14 behaviours from a representative survey of UK residents in 2009 was 3.87 (Thornton, 2009). As the world-view and attitude of the Footpaths' participants suggests that they were more concerned about the environment than the general population, this finding may reflect the well reported attitude-behaviour gap in pro-environmental behaviour (Blake, 1999; Kennedy *et al.*, 2009; Kollmuss and Agyeman, 2002).

Although frequency of pro-environmental behaviour for Footpaths' participants did not differ from that of the general population it was significantly correlated with both NEP and DEFRA category scores before taking part in Footpaths. This suggests that participants with a more pro-environmental world-view and attitude were more likely to perform pro-environmental behaviours but that overall Footpaths' participants did not behave in a more environmentally friendly way than the average UK resident.

Carbon footprint size

Results for carbon footprint size are more in line with the more pro-environmental world-view and attitude of the Footpaths' participants, with a mean of 10.98 tonnes of CO_2 compared to a mean carbon footprint of 12 tonnes of CO_2 per year for the average UK resident calculated using the same carbon footprint calculator. Before taking part in Footpaths the carbon footprint of participants was very variable, ranging from a low of 5.03 tonnes per year to a high of 50.44 tonnes. Size of carbon footprint before taking part in Footpaths was significantly negatively correlated with NEP score and significantly positively correlated with DEFRA category, although the correlation with NEP was weak. This suggests that pro-environmental attitude and world-view were reflected in the behaviour of the participants as measured by carbon footprint size.

Measures related to the Reasonable Person Model (RPM)

The RPM had not previously been operationalised in the field of pro-environmental behaviour change and therefore there were no measures already developed which could be used. Existing measures developed for specific constructs including mindfulness, confidence, and competence were adopted and 9 further questions were developed which attempted to specifically address aspects of the RPM. Factor analysis of these 9 questions yielded two factors, one related to model building and one related to effectiveness. Two other questions which explored aspects of meaningful action either did not load heavily on any factor, or were the only item loading strongly on a factor, and therefore were considered as two separate items. participation and responsibility.

Before taking part in Footpaths, participants scored between 2 and 5 on the model building factor with a mean score of 3.27. A score of 3 would suggest that participants did not think they had either weak or strong mental models of how to reduce their

carbon footprint. The mean score for effectiveness was 3.29, with a range from 1.88 to 5, where a score of 3 would have suggested that participants felt neither effective nor ineffective. This may indicate that Footpaths' participants had a slightly greater belief in their understanding about how to reduce climate change and slightly greater feelings of effectiveness than a theoretical average individual.

Model building was also assessed using mindfulness as mindfulness has been associated with pro-environmental behaviour in previous studies. The mean for mindfulness was 2.80 with a range of 1.07 to 5.20 where 1 is very mindful and 6 is mindless. This suggests that Footpaths' participants were slightly more mindful than mindless before taking part in Footpaths.

Effectiveness was also assessed through separate measures of self-efficacy and perceived ease, which might be related to feelings of confidence and competence, elements of the effectiveness domain of the RPM. Self-efficacy scores ranged from 3 to 9.4 with a mean of 6.14 where 5 would be neither confident nor unconfident about the ability to perform pro-environmental behaviours. As this self-efficacy scale was designed for this study there is no data to compare these scores with. Perceived ease scores ranged from 1.9 to 5.45 with a mean of 3.97 where a mean of 3.5 would be neither competent nor incompetent to perform pro-environmental behaviours. This is similar to the mean for perceived ease of 3.83 for a representative sample of the UK public reported by the Home Front project from which the scale was adopted (Eden Project, 2009).

Mean scores for responsibility and participation were 4.37 and 4.17, where a mean of 3 may indicate that participants did not feel particularly responsible, and that they did not feel strongly about whether their actions would make a difference to climate change. The range for responsibility was from 3 to 5 and for participation it was 2 to 5. This suggests that participants in Footpaths felt very strongly about personal responsibility and believed in the importance of participation. This conclusion is supported by two other measures seeking to assess feelings of personal responsibility and belief in the importance of individual action which had mean scores of 4.01 for responsibility and 4.69 for individual action.

Summary of baseline measures

It seems that, before joining Footpaths, participants were not representative of the general UK population in a number of respects. Their world-view and attitude were more pro-environmental than average, and their carbon footprint was somewhat lower. They may have been more mindful, and might have had greater feelings of responsibility and a greater belief in the importance of participation, although there are no comparative data for these measures. They had somewhat better mental models of how they might change their lives than might be predicted for the general population, and they had slightly greater feelings of effectiveness, although again there was no comparison group for these measures. Their frequency of pro-environmental behaviour and their perception of the difficulty of making changes were, however, very similar to representative samples of the UK population.

4.4.2 Relation of results to research questions

For this study reasonable behaviour for individuals who had pro-environmental world-views and attitudes was operationalised as adopting pro-environmental behaviour. Footpaths' participants clearly had relatively pro-environmental world-views and attitudes before taking part in Footpaths. If the Footpaths programme provides a supportive information environment then reasonable behaviour should increase after taking part in Footpaths. The first two research questions address this issue, and relate to the evaluation dimensions of speed, reliability, durability and generality.

1. *Do participants in the Footpaths programme change their behaviour and reduce their carbon footprints after taking part in a Footpaths group?*
2. *Are any increases in pro-environmental behaviour and reductions in carbon footprint and energy use durable?*

Analysis indicated that the majority of participants in the Footpaths programme increased their pro-environmental behaviour and reduced the size of their carbon footprints immediately after taking part in Footpaths and that these changes were maintained after a year. The changes were not statistically related to the reason for joining, nor were they related to any of the socio-demographic variables. The frequency of pro-environmental behaviour was positively correlated with world-view both before

taking part in Footpaths and one year later, with a stronger correlation one year later. This suggests that behaviour aligned better with world-view one year after joining a Footpaths group than before participating in Footpaths. The frequency of pro-environmental behaviour was also positively correlated with attitude both before taking part in Footpaths and one year later, with a stronger correlation one year later. This suggests that behaviour also aligned better with attitude after participating in Footpaths. An improvement in the correlation between world-view and frequency of pro-environmental behaviour, and attitude and frequency of pro-environmental behaviour, might be an indication of an increase in reasonable behaviour as defined in this study.

In answer to an open-ended question about changes they had made or were planning to make to their lives as a result of participating in a Footpaths group, respondents mentioned 240 actions that they had already taken, and 122 actions that they were planning to take. This is an average of four actions already taken per participant, with a further two planned. Eighty-nine percent of the changes already made were primarily changes in behaviour, with eleven percent of the changes made related to physical measures such as installing insulation. The five most popular changes were turning down the heating, reducing car travel, eating more local/seasonal food, monitoring home energy use, and eating less meat and dairy. This list includes items which are considered to be "harder to change behaviours" by DEFRA (2008). The actions planned as a result of participating in a Footpaths group are divided almost evenly into behavioural changes and physical measures. The five most popular were grow more food, install PV, insulate house walls, other insulation and install water butts. A willingness to engage in the harder to change behaviours may be related to the pro-environmental world-view and attitude of Footpaths' participants, or it may be that people are more willing to embrace the more difficult behaviours after taking part in a Footpaths group as part of an increase in reasonable behaviour.

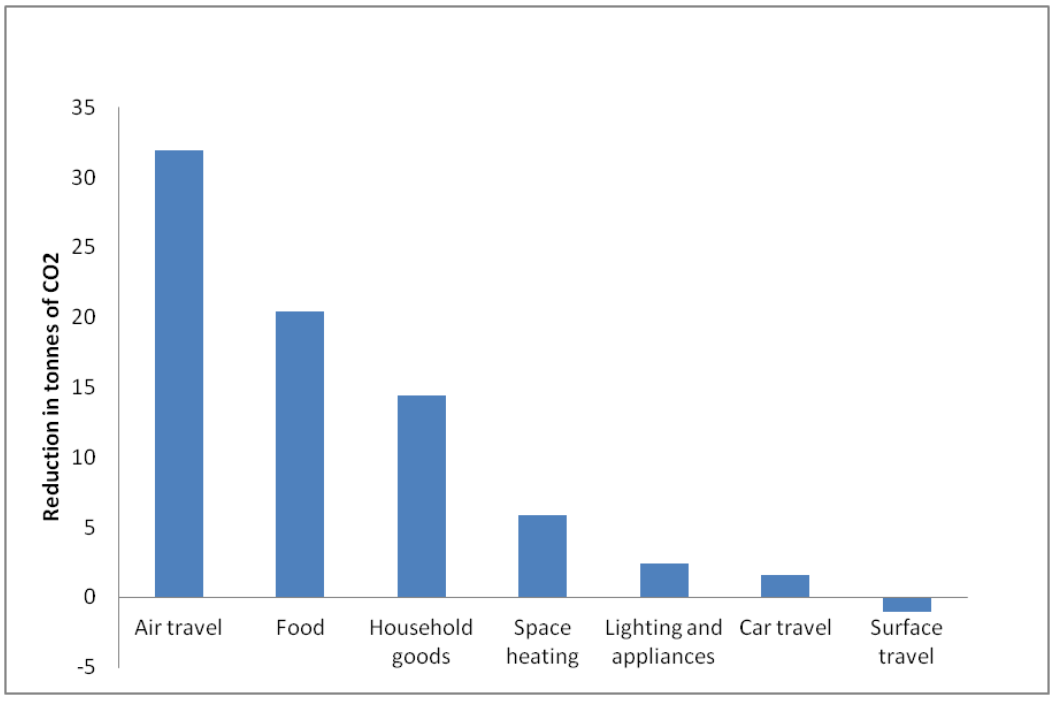
Responses to questions about housing, travel and behaviour were used to calculate an overall carbon footprint at all three times. There was a significant reduction in carbon footprint size of 15% from before to immediately after participating in a Footpaths group suggesting that participation in Footpaths was related to a significant reduction in carbon footprint size. There was a 20 % reduction in the size of carbon footprint after a year (Table 4.7). Carbon footprint was negatively correlated with world-view both

before Footpaths and one year later with a stronger correlation after a year. This suggests that the size of carbon footprint aligned better with world-view one year after joining a Footpaths group than before participating in Footpaths possibly indicating an increase in reasonable behaviour after participating in Footpaths.

Carbon footprint size was calculated from answers to questions about eight different lifestyle areas (Table 4.8). Changes in carbon footprint over time attributable to these different lifestyle areas suggest that significant changes to carbon emissions were related to water heating, lighting and appliances, and food. Of these three areas, only food was among the top five changes that participants reported they had made to reduce their carbon footprints. The action that participants mentioned most often was turning the heating down, followed by reducing car travel, eating more local/seasonal food, monitoring of home energy use and eating less meat and dairy.

These findings contrast with the absolute reductions calculated for each of the lifestyle areas for all Footpaths' participants from before Footpaths to one year later (Table 4.9). The largest contribution to reductions in carbon footprint was from reductions in emissions associated with air travel, with food contributing the second largest reduction, followed by household goods (Figure 4.10).

Figure 4.10 Carbon footprint reductions in tonnes of CO_2 by lifestyle area



When comparing the year before participating in Footpaths and the year after, emissions calculated from recorded household energy use and energy use associated with air travel showed decreases of 22% and 74% respectively, while emissions calculated from car use increased by 4%. Although these data were only available for a small number of participants they again suggest that significant changes in behaviour and carbon footprint occurred after participating in Footpaths. Also, despite the low number of participants providing actual energy use information there were significant correlations between reductions in emissions from recorded energy use and reduction in carbon footprint size. This suggests that carbon footprint size may be a useful proxy for energy use despite the fact that it is estimated from contextual and behavioural information provided by participants. Concerns have been raised that self-report measures do not accurately reflect actual behaviour but this does not seem to be an issue for those Footpaths' participants for whom both footprint and energy use data were available.

In summary, Footpaths' participants increased their pro-environmental behaviour and reduced the size of their carbon footprints after taking part in Footpaths, and these changes were durable, lasting for at least a year after they joined a Footpaths group. Furthermore reductions in carbon footprint were not just durable, but they increased between the time the Footpaths group finished and a year after the start of the group. This suggests that Footpaths meets the evaluation criteria of speed, reliability, durability and generality.

Having identified that the Footpaths programme is effective in changing behaviour, the remainder of the research questions are concerned with the processes that underlie that effectiveness.

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*

Model building

The model building factor showed a significant and durable increase after participation in Footpaths suggesting an improvement in understanding and exploration and a decrease in confusion. This may indicate that a lasting increase in knowledge and comfort with knowledge about reducing personal carbon emissions is related to participation in a Footpaths group. Changes in model building are correlated with

changes in both effectiveness and self-efficacy. This may indicate that mechanisms which support model building also support effectiveness.

Mindfulness showed no significant change associated with participation in a Footpaths group at any time. It was not significantly correlated with any other measures related to the RPM before or immediately after participation in Footpaths, although it was negatively correlated with perceived ease and positively correlated with individual responsibility a year later. Mindfulness was not significantly correlated with model building at any of the three times, nor was there any correlation between changes in mindfulness and model building suggesting the mindfulness as measured by the MAAS is not related to model building. The lack of statistically significant change in mindfulness supports the suggestion that it is a dispositional attribute rather than a state (K. W. Brown and Ryan, 2003a)

Improvement in understanding was assessed by comparing the understanding of the relative impact of different actions on reducing carbon emission before and after participation in Footpaths. The percentage of participants correctly identifying which actions were more significant increased after participating in a Footpaths group which suggests that an absolute increase in understanding is related to participation in a Footpaths group.

These findings demonstrate that scores for measures related to model building increase after participation in a Footpaths group, and this may indicate that the environment provided by the group facilitates model building.

Effectiveness

The effectiveness factor showed a significant and durable increase after taking part in a Footpaths group. This suggests that participants in the Footpaths programme experienced a lasting increase in feelings of effectiveness after taking part in a Footpaths group. Changes in effectiveness were positive correlated with changes in model building and with changes in self-efficacy. These findings may indicate that the mechanisms which support increases in effectiveness also support model building and increases in self-efficacy.

Separate measures were used to assess confidence and competence, both of which were expected to relate to effectiveness. Self-efficacy, a measure of confidence, showed

significant and durable increase after participating in Footpaths. Competence was assessed through a comparison of perceived ease with actual ease, although this might also be conceptualised as a measure of model building with better understanding of effective actions leading to increased perceptions of ease. Perceived ease also showed a significant and durable increase. Changes in self-efficacy were positively correlated with changes in perceived ease as well as with changes in model building and effectiveness. This suggests a relationship between changes in confidence and competence as expected, and also between confidence and model building and between confidence and effectiveness

These findings demonstrate that scores related to feelings of effectiveness increase after participation in a Footpaths group and may indicate that Footpaths provides an environment which promotes feelings of effectiveness, and specifically confidence and competence.

Meaningful Action

Meaningful action was explored using four measures: two of the items from the 9 item RPM measure, responsibility and participation; individual responsibility; and the importance of individual action. RPM responsibility showed significant and durable increases after participation in Footpaths. Individual responsibility did not show significant change over time although this may be related to the strongly positively skewed distribution of this measure which allowed little potential for increase.

There were no significant changes in belief in the importance of participation or in the importance of individual action over time. These findings may be associated with the strongly and positively skewed distribution of these measures before participation in Footpaths which allowed little potential for increases.

These findings indicate that taking part in Footpaths may have affected participants' feelings of responsibility to take action, but not their belief in the importance of individual action. However, the lack of change in the belief in the importance of individual action may be related to the high scores of this variable before participation.

The findings relating to model building, effectiveness and meaningful action suggest that increases in feelings of effectiveness and improvement in model building for Footpaths' participants were both significant and durable, while increases in feelings of

responsibility were significant and possibly durable, and that belief in importance of individual action did not change significantly. This may indicate that Footpaths provides a supportive information environment as proposed by the RPM. If Footpaths does provide a supportive information environment then the RPM suggests that this will lead to an increase in reasonable behaviour which appears to be the case for Footpaths' participants as discussed in relation to the first and second research questions. The relationship between a supportive information environment and reasonable behaviour is explored further in discussion of the fourth research question.

4. *Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased model building, feelings of effectiveness and belief in meaningful action?*

There were significant correlations between increases in model building and both increases in pro-environmental behaviour and decreases in carbon footprint. This may indicate that having a clearer understanding of what actions are important and how to take those actions leads to an increase in pro-environmental behaviour. Significant correlations were also found between increases in effectiveness and both increases in pro-environmental behaviour and reductions in the size of carbon footprint. Increases in confidence were significantly correlated with both increases in pro-environmental behaviour and decreases in carbon footprint, while increases in competence were correlated with reductions in the size of carbon footprint. Only one of the four items used to assess changes in constructs related to meaningful action showed any significant change over time, and this change was not significantly correlated with increases in pro-environmental behaviour or decreases in carbon footprint size.

Increases in pro-environmental behaviour and decreases in the size of carbon footprint appear to be correlated with increases in both model building and effectiveness. If increases in model building and effectiveness are outcomes of an environment which supports information needs, then this suggests that this supportive environment is associated with increases in reasonable behaviour as defined by this study.

Summary

The Footpaths programme appears to fulfil De Young's evaluation criteria of speed, reliability, durability and generality (De Young, 1993). Participation in Footpaths was

followed by significant and durable increases in pro-environmental behaviour and reductions in size of carbon footprint. Continuing reduction in the size of carbon footprint one year after the Footpaths groups began suggests that participants continued to make changes to their lives after the Footpaths groups finished. Furthermore, frequency of pro-environmental behaviour appears to align better with both world-view and attitude after participation in Footpaths, and size of carbon footprint aligns better with world-view, suggesting that taking part in a Footpaths group may have helped people to align their behaviour more closely with their beliefs.

Footpaths does not, however, meet the criterion for particularism. Footpaths' participants were better educated and had more pro-environmental world-views and attitudes than the general populace. Furthermore, the format of the Footpaths may be unappealing to many people as it requires a substantial commitment of time and the study group format may be uncomfortable for some individuals.

The changes in behaviour following participation in Footpaths appear to be associated with improvements in model building and feelings of effectiveness. This may suggest that improved mental models and greater feelings of effectiveness have a role in facilitating behaviour change. If improvements in model building and effectiveness are important to changing behaviour, then identifying the processes which facilitated these improvements may allow these processes to be incorporated into other intervention types to aid their effectiveness. The qualitative part of this study seeks to identify these processes.

Chapter 5: Qualitative Study

5.1 Introduction

The previous chapter reported on the quantitative part of the study which investigated the effectiveness of the Footpaths programme in promoting pro-environmental behaviour change and explored whether that effectiveness could be related to a supportive informational environment as suggested by the Reasonable Person Model (RPM). This chapter describes the qualitative aspects of the study, including the methods used for the collection and analysis of qualitative data, and the principal results. The qualitative results are discussed further in Chapter 7 in conjunction with findings from the quantitative study.

The quantitative part of the study attempted to develop measures to operationalise the RPM and to investigate to what extent it might account for changes in pro-environmental behaviour in Footpaths' participants. The survey approach adopted in the quantitative study is restrictive, however, as respondents can only choose from set response options relating to the RPM. This does not allow participants to discuss issues which they think are important or to expand on their responses to the survey. In the qualitative part of the study participants were asked open-ended questions and could express their experience in their own words. Observations of a Footpaths group allowed the researcher to gain first-hand experience of the environment provided by the groups and to observe the processes taking place. Although the RPM was used to guide interview questions and as an interpretive framework, the methods adopted allowed other explanations to emerge during data collections and analysis.

Observations of six sessions of one group were undertaken and semi-structured interviews were conducted with 24 participants from the first round of Footpaths groups. The focus of the qualitative part of the study was to explore which aspects of the Footpaths programme might have influenced participants in making changes or thinking about making changes to their lifestyles. The qualitative part of this study addressed two of the five research questions proposed at the end of Chapter 2.

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*

5. *What other elements of the environment provided by small, group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?*

5.2 Methods - Procedures and materials

Information for the qualitative study was collected from three sources: observation of group sessions; interviews with participants; and a written sort exercise undertaken during the interviews. All the interviewees had completed questionnaires and carbon footprint forms at T1 and T2.

5.2.1 Observations

Observations were undertaken on the first six sessions of one Footpath group. The final session was a social event and it was not felt appropriate to make formal observations. Observation ranges from complete observer to full participant observer (Robson, 2002). The choice of how involved the observer should be in the group depends on a variety of factors. Because the groups were small, with five to ten members, and fully participatory, it seemed possible that an uninvolved observer would be disruptive to the group. Therefore it was decided that the researcher would take a full participant observer role. The group chosen for observation was one in which the researcher is a natural participant as it was drawn from a community that the researcher is part of and is made up of people who knew the researcher. This group was chosen to allow minimal disruption of the group by the observer. The other groups were drawn from communities of which the researcher was not a member and so the presence of the observer would be unnatural and possibly disruptive to the process.

Method

The purpose of the observational part of the study was to try to understand how the Footpaths programme worked and to explore how participants responded to the programme through direct observation of group sessions. To achieve this the researcher asked permission to attend all seven sessions of the Footpaths group and take discreet notes. The facilitator for the group to be observed discussed the possibility of having the researcher participate in the group as an observer individually and privately with all group participants, and all the participants agreed. Participants were informed by the

facilitator that they could refuse to have an observer in the group, that they could ask the observer to leave at any time, either directly or through the facilitator, and that they could withdraw at any time. The researcher re-iterated these points at the first session. Participants were then asked to sign a consent form if they were still willing for the researcher to take part in the sessions as a participant observer (see Appendix 7).

The researcher participated fully in the group sessions, and took unobtrusive notes during the first six sessions to record what happened and some of what was said. The final session was a social event and it was not felt appropriate to make formal observations. Immediately after the sessions the researcher wrote up these notes into an account of the session divided into notes on how the group was run, and how the participants reacted, both what they did and what they said. The researcher also noted down general comments, her own immediate reactions to the session, and reflections on what happened and what was said. After the first session the researcher discussed the notes with supervisors and refined the data collection strategy.

Transcription and Analysis

Usually immediately afterwards, and at the most within 24 hours the researcher typed up the notes into Word 7, clarifying and elaborating where appropriate. Finalised transcriptions were imported into NVivo 8 software for coding and analysis. The data were analysed using the three domains of the RPM as high- level themes: model-building, being effective, and meaningful action. Any material which appeared to fit with these high-level themes was coded to the theme, and then re-coded to sub-themes and lower level clusters where appropriate. Data from the observations which did not fit into this framework were coded to an "other" category and were then grouped into emergent themes (Braun and Clarke, 2006).

5.2.2 Interviews

Interviews were conducted immediately after the last group session (T2) to look for self-reported changes in attitudes, behaviour and knowledge which might relate to participation in the group and to try to gain an understanding of the processes operating within the group which might contribute to these changes. The purpose of the interviews was to collect information directly from participants about their experience

of being part of a Footpaths group. The interviews focused on collecting data which indicated whether, after taking part in the groups, participants felt they had:

- a better mental model of the environmental impact of their lifestyles,
- a better mental model of how they might change their lives to reduce their environmental impact,
- increased feelings of confidence and competence about changing their lives
- an increased interest in making changes to their lives to reduce their environmental impact

The interviews also explored the aspects of participating in a Footpaths group which the interviewees thought had greatest influence on their thinking and behaviour.

The interviews used a semi-structured approach with open-ended questions, allowing an opportunity to examine areas of interest in-depth and to explore any new themes which arose during the course of the interview. According to Robson a semi-structured interview "Has predetermined questions, but the order can be modified based upon the interviewer's perception of what seems most appropriate. Question wording can be changed and explanations given; particular questions which seem inappropriate with a particular interviewee can be omitted, or additional ones included" (2002 p.270-271). The semi-structured interview is also known as the "general interview guide approach" where "topics and issues are specified in advance, in outline form; interviewer decides sequence and wording of questions in the course of the interview" (Teddlie and Tashakkori, 2009).

Robson recommends that the interview schedule for semi-structured interviews should consist of introductory comments, a list of topic headings with key questions related to the headings, prompts associated with each question, and closing comments (2002 p.278). Gillham (2000) outlines five steps in preparing an interview schedule which include identifying the key topics, framing questions, checking whether the questions are open not closed, and choosing prompts and probes. Gillham (2000) also suggest that semi-structured interviews should consist of five to ten questions plus prompts.

Instrument

Interview questions were open-ended and allowed participants to discuss their experience of the Footpaths group in their own terms. All questions were discussed with and approved by the Footpaths' organisers. In addition to questions developed by the researcher, questions specifically on group processes were added at the request of the Footpaths' organisers. These questions were not included in this analysis. The interview schedule is provided in Appendix 8. The interviews began with a question on how the interviewee became part of a Footpaths group as a way of opening the interview with an easy to answer question. This was followed by a question on what participants thought they would get from attending the group and whether they thought they got what they hoped to get. Participants were also asked what else they got from participating. These questions were designed to identify issues of concern to participants to see whether RPM elements would be mentioned by participants without prompting. Further questions, reflecting the three domains of the RPM, were more focused and explored:

- Participants' feelings of responsibility for reducing carbon footprint before and after Footpaths
- Participants' understanding about reducing their carbon footprint before and after Footpaths
- Their belief in their ability to reduce their carbon footprint before and after Footpaths
- Changes participants had made or were planning to make and how Footpaths helped

Table 5.1 shows the relationship between the more focused interview questions and the three domains of the RPM.

Following the more focused questions participants were asked what they thought was important about being in a Footpaths group and what their favourite and least favourite things were to encourage them to evaluate the experience as a whole. This was followed by a simplified sorting procedure similar to that used by Wall (Canter, Brown, and Groat, 1985; Wall, 2006). Participants were given small pieces of paper and were asked to write down those elements of the Footpaths experience they thought most influenced

Table 5.1 Interview questions mapped to RPM domains. [1]

Reasonable Person Model Domain	Question
Model building	5. Again, before you joined the group, and thinking about how to reduce your carbon footprint what did you think about the information you had *Was it easy to understand?* *How about applying it to your life?* 6. Having done the group, what do you think about the information you now have about how to reduce your carbon footprint? *Is it easy to understand?* *How about applying it to your life?* 9. Overall, thinking about the effect of being in the group, do you think you know more about the environmental impact of your life? *How did the group help?*
Being effective	7. Before the group, how did you feel about reducing your carbon footprint – on an emotional level? *Positive or negative?* 8. And on an emotional level – how do you feel now about reducing your carbon footprint? 9. Overall, thinking about the effect of being in the group, do you feel more confident about reducing your carbon footprint? *Why? Was there anything about Footpaths that helped?*
Meaningful action	9. Overall, thinking about the effect of being in the group are you making changes as a result of being in the group? *How has the group helped?* 3. Thinking about before you joined the group, how much did you think it was your responsibility to reduce your carbon footprint? 4. And now, how much do you think it is your responsibility to reduce your footprint? *Has it changed? Why do you think it's changed?*

[1] *The questions are presented by domain and not by question number order, and some questions are related to more than one RPM domain*

them in making changes or planning to make changes to their behaviour. They noted each element on a separate small piece of paper and then sorted these into rank order from most to least important. Participants were encouraged to use as many pieces of paper as necessary and to discuss what they were writing if they wanted to. They were then asked to arrange the influences in order of importance, and finally to number the pieces of paper to reflect the ranking.

The questions on group processes requested by the Footpaths' organisers followed the sort exercise, and at the end of the interview participants were asked if they wanted to add anything that had not already been asked about and whether they had any questions for the researcher. Finally the researcher thanked the participants, the digital recorders were stopped, and the interview was closed.

5.2.3 Interviewees

The researcher arranged to visit the final session of each of the round one Footpaths groups to introduce herself to the participants and to briefly explain the purpose of the interviews. The participants were all asked by the group facilitators in advance whether they would be willing to have the researcher visit the group to discuss interviews. All of the groups were willing to be visited and all of the participants who were involved in the study agreed to be interviewed. Interview dates were arranged either at the meeting or subsequently via phone or email.

The intention was to interview as many of the participants in the first round of Footpaths groups as possible. Of the 34 participants involved at the beginning of the study, 27 were still involved at the end, and 24 of those were interviewed. Time constraints and health issues prevented interviews from taking place with the remaining three participants although they indicated their willingness to be interviewed. Table 5.2 presents a summary of the socio-demographic data about the interviewees with

Table 5.2 Socio-demographic characteristics of interviewees

Variable		Interviewees (N=24)		All participants (N=89)
Gender				
	Female	20	(83.3%)	(75%)
	Male	4	(16.7%)	(25%)
Age				
	20 to 29	1	(4.2 %)	(11.4%)
	30 to 39	4	(16.7%)	(20.5%)
	40 to 49	8	(33.3%)	(27.3%)
	50 to 59	4	(16.7%)	(23.9%)
	60 to 69	7	(29.2%)	(13.6%)
	70 to 79	0		(2.3%)
	80 to 89	0		(1.1%)
Household size				
	1 person	6	(25.0%)	(21.6%)
	2 person	10	(41.7%)	(34.1%)
	3 person	13	(12.5%)	(15.9%)
	4 person	5	(20.8%)	(19.3%)
	5 person	0		(5.7%)
	6 person	0		(3.4%)
Tenure				
	Own house	9	(37.5%)	(33%)
	Have a mortgage	9	(37.5%)	(42%)
	Rent	6	(25.0%)	(22.7%)
	Live rent free	0		(1.1%)
	other	0		(1.1%)
Income				
	Up to £10,399	4	(16.7%)	(12.3%)
	£10,400 to £20,799	7	(29.2%)	(25.9%)
	£20,800 to £31, 199	3	(12.5%)	(18.5%)
	£31,200 to £41,599	3	(12.5%)	(18.5%)
	£41,600 to £51,999	0		(1.2%)
	£52,000 to £59,999	3	(12.5%)	(11.1%)
	£60,000 to £69,999	0		(1.2%)
	£70,000 to £79,999	0		(2.5%)
	£80,000 to £89,999	1	(4.2%)	(3.7%)
	Above £90,000	0		(4.9%)
Qualifications				
	A-level/Higher/BTEC	2	(8.3%)	(8.7%)
	Vocational/NVQ	1	(4.2%)	(2.3%)
	Degree or equivalent	11	(45.8%)	(40.9%)
	Post-graduate qualification	8	(33.3%)	(38.6%)

comparative data on all participants. The interviewees were reasonably representative of all participants although women and pensioners were somewhat over-represented. Of the 24 interviewees, 20 were female (83%) and 4 were male (17%) which represented a slightly higher proportion of females to males compared to all participants (female 75%, male 25%). The distribution of ages was similar with fewer participants at the extremes of the age range. Household sizes were also similar as were tenure, income and qualifications. Seventeen households (70.8%) were without children compared to 59 (67%) for all participants, and five households (20.8%) included pensioners compared to ten households (11.4%) for all participants.

In order to protect the privacy of the interviewees no detailed demographic information will be associated with quotations from the interviews as the interview sample includes almost the entire population of the first round of Footpaths groups and providing demographic information might allow individuals to be identified.

5.2.4 Piloting

The interview questions were piloted with two of the Footpaths organisers and then with three of the former members of the Leicester Carbon Rationing Action Group (CRAG) as they had direct experience of involvement with a group-based intervention to promote pro-environmental behaviour. The CRAG members were recruited for piloting using a snowball strategy starting from one member of the CRAG already known to the researcher. After the first two pilot interviews with the Footpaths organisers the questions were clarified and then they were further refined following the final three pilot interviews. Ideally the interview questions would have been piloted with a sample of Footpaths' participants, however the total number of participants was sufficiently small that it was decided not to reduce the number of potential interviewees by piloting with participants.

Conducting the interviews

Interviews were conducted in locations agreed between the participant and the researcher, either at the home of the participant, the venue where the group met, or at the University. Interviews took place between December 2010 and April 2011, and all but one interview was conducted within two weeks of the final group session. All

interviews were conducted by the researcher to minimise possible interviewer effects resulting from different interviewers which might bias or confound the data (Gray, 2009). Interviews lasted between 30 and 60 minutes with an average of about 50 minutes. Eighteen interviews took place in the home of the participant, five in a meeting room at De Montfort University, and one at the venue where the group met.

Before each interview the researcher introduced herself again, explained the purpose of the interview, who would have access to the information, and how the information would be used. The researcher then asked participants to sign a consent form (see Appendix 9). Participants were informed that the interview data would be anonymous, and the researcher asked permission to record the interview. All participants granted permission, and two digital recorders were used to record each interview. A useable recording was obtained for every interview.

5.2.5 Analysis of interviews

Transcription

All the interviews were initially transcribed by the researcher into Word 2007 and reviewed for accuracy. Finalised transcriptions were imported into NVivo 8 software for coding and analysis.

Analysis

Data were analysed using a priori and emergent codes (Creswell, 2007) to explore which elements of the group experience participants found helpful in promoting pro-environmental behaviours and reducing carbon footprints. The a priori codes were based on RPM constructs (Table 5.3).

NVivo software was used to aid the process of qualitative data analysis. NVivo allows portions of text to be coded as part of a hierarchic structure allowing material to be grouped. Initially interviews were coded based on interview questions including responses for all interviewees. Responses to each question were then reviewed and recurrent themes and sub-themes within each set of answers were identified. This preliminary analysis allowed the researcher to familiarise herself with the interview data and to begin to identify themes across the question answers. It also formed the basis for

a report to the Footpaths organisers summarising the interview findings to assist in developing the Footpaths programme further, although this report did not affect the design of the programme for the groups in rounds two or three.

Table 5.3 A priori codes used in analysis of interview data

RPM Domain	Theme
Model building	Understanding Exploring
Being effective	Clear-headedness Confidence Competence
Meaningful Action	Participation Making a difference Respect

The data were then re-analysed using the three domains or high-level themes from the RPM: model-building, being effective, and meaningful action. The initial analysis by question indicated that these themes were present along with other themes. Interview material which appeared to fit with each of these high-level RPM themes was coded to the theme. Within themes the material was then re-coded to sub-themes, and within each sub-theme to more defined clusters where necessary. This process continued until no further themes were identified. At each iteration the original interview was re-examined and material was re-coded as necessary (Braun and Clarke, 2006). This provided a connection between the RPM themes and the words participants used to describe their experience. This use of coding is consistent with a realist perspective which "reports experiences, meanings and the reality of participants" (Robson, 2002 p. 474).

Data from the interview transcripts which did not fit into any of the three high-level RPM themes were assigned to an "other" category for further analysis. Data from the "other" category were then coded using emergent themes which were then organised

into clusters, and then higher level themes. An attempt was made to identify domains or high-level themes which were present in the data but not part of the RPM. Links were identified where possible between domains identified in this way and RPM domains. The coded extracts for each theme were then reviewed and the coding was refined where necessary.

Validity

A major risk to the reliability of qualitative research is the subjectivity inherent in the coding of data. To reduce the risk of researcher bias in coding a colleague who was familiar with the RPM and has a background in qualitative research and domestic energy use was asked to code one of the interviews using the a priori codes from the RPM so that the coding decisions could be compared. There was a close correspondence between the two sets of coding with about a 70% agreement, rising to about 90% after discussion.

Member checking, where participants are invited to comment on summaries of their own interviews to guard against researcher bias, was planned as a second check on validity (Robson 2002). This was not done as unforeseen circumstances resulted in a substantial gap (nearly a year) between the interviews being conducted and the analysis of the interviews being completed.

5.3 Qualitative Results

One of the objectives of this study was to develop an understanding of the processes which might facilitate changes in pro-environmental behaviour in participants in group-based interventions. This objective is addressed by two research questions which form the focus for the analysis of the qualitative data:

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*
5. *What other elements of the environment provided by small, group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?*

This section presents results from observations of group sessions and from the 24 interviews with participants which took place soon after the last session of each of five

groups. The observations relate only to one of the five groups and the experience within the group sessions will have varied between the groups as each group had a different facilitator and different participants. The basic structure of the sessions would have been the same, however, and the participants were all exposed to the same exercises, the same games, and the same frameworks for discussion. Information about the structure and content of the sessions is provided in Section 3.23.

The purpose of the observational part of the study was to examine first-hand both the programme elements and how participants responded to these elements through direct observation of group sessions. The purpose of the interviews was to identify the elements within the Footpaths groups which were important to participants and which they thought might have affected their thinking and/or their behaviour. During the course of the interviews participants were invited to reflect on their experience in the group in a variety of ways, both through questions specifically on information, effectiveness and actions, and through more general questions. They also undertook a sort exercise where they wrote down the elements of the experience that they thought were most influential on their behaviour and/or thinking and placed these in rank order.

The RPM was used as a framework for approaching the analysis of the qualitative data, and the presentation of the results uses the same framework. In addition, emergent themes identified in the analysis are explored. The analysis is divided into four sections: one for each of the RPM domains, and one for emergent themes. Results from observations for each domain are reported first, followed by analysis of responses to the first two general questions which sought to identify issues of concern to participants prior to introducing RPM themes. Analyses of responses to questions focusing on RPM themes are then presented followed by the results from the sort exercise. These more focused questions invited participants to reflect on themes related to the RPM including personal responsibility for carbon emissions, the accessibility of information and ease in applying it to lifestyle change, feelings about reducing carbon emissions, understanding of the environmental impact of everyday life, and confidence to reduce carbon emissions. Answers to further questions on changes made as a result of being in a Footpaths group, participants' most and least favourite aspects of Footpaths, and whether participants would recommend Footpaths to a friend were also included in this part of the analysis as they followed the questions focusing on RPM themes. A

summary of the themes present in the responses to the interview questions is presented in Table 5.4.

Table 5.4 Summary of themes occurring in responses to the first two questions

Theme	Number of interviews in which theme was present		Overall frequency of occurrence of theme	
	General questions	Focussed questions	General questions	Focussed questions
Improving understanding	15	24	19	101
Exploration	10	24	12	115
Competence	8	22	9	48
Working together	7	15	7	34
Social contact	6	14	7	24
Managing information flow	2	18	2	36
Making a difference	2	24	2	61
Respect	2	7	2	9
Motivation	2	10	2	28
Confidence	0	18	0	20

5.3.1 The opportunity to build and extend mental models

Observations

Opportunities for exploring information and increasing understanding were fundamental to the structure of the Footpaths sessions, and they were also of primary importance to participants who were eager to extend their knowledge and frustrated by a lack of information. The motivations for joining a Footpaths group mentioned by participants in the first session included wanting to find out about one's carbon footprint, wanting to gain knowledge and wanting to make some changes, but not knowing which changes they should be considering. Acquiring, understanding and coping with information was important to participants with some at the first session concerned that there might not be enough practical information or that the information might be overwhelming.

Participants were particularly eager for detailed procedural information to apply to their own lives.

Participants expressed concern with insufficient information and the frustration of not having all the facts. One participant summed up the frustration expressed by many in the group:

> *The lack of all the information we need to make a decision leads to paralysis – where we feel unable to do anything because we don't know what the best thing is, but also to demotivation and demoralization.* (P.21)

Card-based exercises and games provided information in a format which allowed participants to engage with and explore that information. Participants were interested and sometimes surprised by the information in the card-based exercises. Where the information on the cards did not fit well with participants' prior understanding they were often resistant to accepting the information, but the discussions arising from the exercises gave an opportunity to explore these concerns and often participants moved towards acceptance as a result of exploring the information with others. Discussion following on from the card exercises also provided participants with an opportunity to explore issues and learn from the experiences of others. For example, a card about domestic waste led to a discussion of food waste and participants shared ideas for dealing with leftover food which ranged from whether you could eat food after its sell-by date to what food waste was suitable for composting. In another example, participants were surprised by the differing amounts of electricity used by different appliances. Participants questioned where the energy use information came from and how to work out how much electricity items used as they were eager to investigate for themselves how much electricity was consumed by their own appliances.

Games about home energy and travel gave an opportunity for participants to learn about and explore changes that they could make to their lives in a structured and non-threatening way. As the focus of the games was on changes that could be made by a fictional family, participants were not put on the spot about what they might or might not do themselves but they were able to explore what could be done. The games also provided an opportunity for participants who had direct experience of making one of the changes to comment on it, providing first-hand experience to aid understanding.

Participants were surprised at the cheapness of some measures, such as cavity wall insulation, and the possible savings from making changes both to their homes and to their travel patterns. The fact that participants enjoyed the games appeared to help them to manage the information flow and to engage with the information. In general these two games provoked a lot of discussion about whether it was worth doing things, how to do them, and how to choose what to do. It was clear in the discussion that there were considerations beyond carbon emissions driving decisions about behaviour such as spending time with family members, aesthetics and comfort.

A game about the carbon emissions associated with various foods gave participants an opportunity to increase their understanding about what contributed to the carbon footprint of foods. Participants appeared to find some of the information difficult to accept, for example participants found it hard to believe that glass had a higher carbon footprint than plastic, showing that existing mental models can be difficult to modify just through presenting information. Discussions around changes in diet were more personal than those around home energy and travel, and participants expressed frustration at the lack of information about some aspects of the carbon footprint of food.

The discussion sessions also provided a way to promote exploration and understanding. Several times discussions on issues were diverted into discussion of practicalities. At the end of the first session participants were anxious to know that there would be more practical information in later sessions. Many of the whole group discussion sessions turned into information sharing sessions. For example a brainstorm on green travel in session one turned into a detailed knowledge sharing discussion about public transport, booking train tickets, etc. A brainstorm on food led to a sharing of information on local food sources, farm shops and vegetable box schemes.

A movement exercise on envisaging the future in the first session provided a way for participants to explore different models of the future. Participants commented that a business as usual future was depressing and not empowering. Comments on a future where the best thing had happened were all positive and people were very attracted by it. They found discussion of that future empowering and expressed an interest in working towards that future.

Responses to the general questions

The model building domain of the RPM contains two major themes – improving understanding and opportunities for exploration. When asked what they thought they would get from going to a Footpaths group nineteen of the twenty-four interviewees mentioned either wanting to increase their understanding and/or wanting to have an opportunity to explore issues around their carbon footprints and reducing the environmental impact of their lives. Of the five interviewees who did not mention either of these as motivations, three stated that they were interested in the issue, which could indicate a desire to explore the subject further and therefore could be included within the opportunity to explore theme. The remaining two were both interested in working with others, one also wanted social contact, and the other was also hoping for increased motivation and to make meaningful changes. When asked whether they got what they wanted from the Footpaths group nineteen of the interviewees mentioned themes relating to either information or exploration or both.

Improving understanding

When asked what they hoped for from joining a Footpaths group fifteen of the twenty-four interviewees indicated that they hoped to increase their understanding of their carbon footprints and how to reduce the environmental impact of their lives. There was overlap between wanting to understand more and wanting to explore but the desire to acquire more information was very prevalent. Participants discussed wanting to learn both about what causes carbon emissions and how to reduce them.

> *I've always been interested in things green; I've never been particularly focused on the carbon footprint reduction side of things so I thought that was interesting.* (P.18)

> *... to find out more about how I can reduce my carbon footprint, to learn more about what causes the carbon* (P.1)

One participant discussed his need not only for information to improve his understanding, but his need for information in a format that he could process.

> *What I hoped for was more insight into the whole sustainable living, the idea of sustainable living. Ideas about what I could do, I wanted sources of information,*

> *because that is one of the things that I struggle with is getting processable lumps of information.* (P.20)

This concern for information and understanding was reflected in the comments on whether interviewees got what they were hoping for from Footpaths. Almost all the participants who mentioned understanding or exploration felt that they had increased their understanding and that they had been given a chance to explore information, particularly around issues to do with their own lives.

> *Probably the sharp bringing up with a few things and it's made me far more aware, like embedded costs, I've thought a lot more about whereas I would have thought about surface level things, it has made me aware of underlying stuff* (P.14)

Some participants identified elements of the sessions that were particularly helpful to them in increasing understanding. Discussing with others what they had done or thought about doing, and playing the games were identified as important in increasing understanding.

> *Some of the games really brought it home, when we had those, either little cards which we put on, this helps by reducing this amount, or little wedges, I think I'm probably a very visual person and I suppose that's some of the information I felt I wanted, you know, if I've got this amount what's the best thing I can do* both *for the environment and for our house and so that kind of helped with that a little bit, made me think more about that* (P.22)

As well as thinking that their understanding had increased, and that they had more information and more clarity about what they could do to reduce their carbon footprints, some participants expressed a desire for more and more definitive information.

> *I think we all just wish there was a web site somewhere that told you the right...the exact answer to every question that you ever ask and the fact is that it just doesn't exist and in some of the cases like the plastic bottle and tin can there isn't a wrong and a right answer because how you decide whether it is better to worry about your carbon footprint or whether it is better to worry about the other ecological impacts of you know, so I think that is something that came out*

that we all wished was there but we all accepted that it wasn't. (P.18)

Opportunities for exploration

Ten interviewees mentioned hoping to get opportunities to explore the issues as a motivation for joining Footpaths; there were two aspects to this, one was the expectation of an opportunity to explore their own lives in depth and the other was the prospect of sharing ideas with others.

> *Actually going through and looking at things in detail was something I was excited about but going through a process rather than just having a vague notion of things because I know that does make a difference when you look at things in...so there was that opportunity to go into detailed carbon footprinting not the numbers but the aspects of my lifestyle and stuff, so to put myself through that process and get more information that way* (P.10)

> *Knowledge, advice, sharing other people's experience, if people had already done something I didn't have to reinvent the wheel all the time.* (P.22)

Again, there is overlap with improving understanding as the goal of the exploration was to learn more, to gain a greater understanding.

<u>Response to focused interview questions</u>

Responses to the focused questions also contained both major themes from the model building domain of the RPM – improving understanding and opportunities for exploration. Most interviewees found that participating in a Footpaths group improved their understanding. This improvement in understanding was attributed both to the provision of information, and the opportunity to explore it. The opportunity to explore information within the group sessions was identified as important by all participants, even the two participants who did not feel that they had learned more as a result of Footpaths and the three who were unsure of whether their understanding had improved. A number of elements were mentioned by participants as facilitating their exploration of the information and therefore in extending their mental models. These included discussing information with others, visualising and making sense of information through games and exercises, exploring what made up their own carbon footprints, and breaking down the issue into areas.

Improving Understanding

In general interviewees thought that participating in a Footpaths group improved their understanding of the information about carbon footprints and the environmental impact of their lives. When specifically asked if they felt they knew more about the environmental impact of their lives 14 participants said yes, 2 said no, 3 said maybe, and the others did not answer the question.

Participants had a variety of concerns about the information they had accessed prior to joining the Footpaths group ranging from those who found it hard to find information, those who found it hard to understand the information they did find, or at the other extreme, those who found the information too simplistic. One participant who was specifically looking for new ways to reduce her carbon footprint reflected the views of those who had not had difficulty in accessing and understanding information.

> *I think it was easy to understand but I think it is very much focused on switching off lights, it's very basic, it's always the same information, it was repetitive, and similar and so there wasn't a variety of ways in which you can approach your carbon footprint.* (P.1)

This participant thought that she already had a good understanding of carbon footprints but that she was able to learn more and to revisit things that she knew previously. This was reflected by other participants.

> *In terms of personal knowledge, yeah, I think it did improve and I think it did re-challenge me and re-awaken me to things that I actually need to be thinking about and need to be doing*. (P.54)

Participants who found the information hard to find reported that "*to get information about what products and services, it feels very hidden, the whole….it's almost like a conspiracy*" P.9, or that "*It just seemed to be very hard to find out any information. And time is a scarce resource, so looking around for something as specific as a carbon footprint and how much you are using is actually quite difficult."* (P.38)

Some participants found the information they could find confusing with one interviewee stating that "*there is a lot of stuff out there that goes quite deep and a lot of people can't cope with that, me included*" (P.2)

Both interviewees who thought that the information they had been able to access prior to Footpaths was simplistic and those who thought that the information was hard to access and confusing seem to have benefited from the information provided within the Footpaths programme. One participant who thought she had a good understanding of the issues around carbon footprints reported that she now knew more because of taking the time to really explore the issues.

> *I do, I know it in a greater depth. I had almost like a tacit awareness of some of the things or I knew some of the information quite lightly but now sort of looking at it and taking time to really examine it's given me a greater depth of knowledge* (P.40)

Participants valued the opportunity to learn in a way that suited them, and to learn about things that were relevant to their lives.

> *It actually made you pick things up at your own pace really as well as the sessions where you were doing things and it was amazing. It was quite informative but it was fun at the same time and we learnt more about more different things.* (P.2)

They valued the way the information covered the whole picture and joined up disparate areas. Participants who had been struggling with understanding how the different aspects of their lives contributed to their carbon footprint appreciated the way the information presented in Footpaths gave them an overview.

> *The four main sections, just linking them. You're kind of aware that, aware of them. I mean we're around it all the…people go to work and do all these sections, they're all linked. Putting the whole picture….* (P.9)

For many participants one of the important things about having an improved understanding is that it helped to motivate them to take action, partly because they had better information on which to act, and partly because having that information encouraged them to act.

> *I've got clearer information and it's spurred me on to things and I sorted out a few things*. (P.20)

Four participants specifically mentioned the importance to them of gaining a clearer understanding of their own carbon footprint as a result of having their carbon footprint calculated at the start of the Footpaths programme. These participants all thought that they would have average or smaller than average footprints, with three of them thinking that they were living in quite a "green" way, and two of them expressing amazement and distress when they discovered what their carbon footprint was.

> *I mean the original carbon footprint quite amazed me because I didn't think originally we were that far away from the average and yet I wouldn't say that our lifestyle as I saw it was that consumerist* (P.14)

Seeing the impact of different areas on the overall carbon footprint was quite important in motivating participants to re-evaluate their behaviour. One participant summed up the way in which knowing her carbon footprint made her re-evaluate her mental model of environmentally friendly living.

> *I was applying various kinds of maxims to my life, things that I should do, some of it from quite long standing some of them a bit more recent. I think having had the carbon footprint done was a bit of an eye opener in say actually looking at the impact of things and how it worked out.* (P.33)

Not all the interviewees thought that participating in Footpaths increased their understanding. Five participants were either unsure that they had increased their understanding or thought that they had not learned very much from Footpaths. One participant summed up the feeling of this group.

> *Do I think it's more accessible, do I think it's more interesting, I can't say it's made a big change so I would say the Footpaths course itself was interesting because it was nice neat format but the information that's always been out there, is still the same and you know some of it is easy to unpack and some of it is dense and boring and you wouldn't want to look into it* (P.27)

The interviewees who were not sure that their understanding had increased or thought that it had not did not mention increased understanding or a desire for information as a motivation for joining Footpaths or as something they expected to get from the group. Instead they were hoping for social contact and/or an opportunity to work with others.

Opportunities for exploration

Participants valued the opportunity to explore issues around carbon footprints and the environmental impact of their lives. They recognised that Footpaths provided a variety of ways of exploring information and increasing understanding

> *I suppose what was nice about the content was that it offered different things, different mediums or formats of expression or learning (*P.7)

Games and other exercises designed to help people visualise and make sense of information were an important part of the Footpaths programme. Thirteen interviewees identified these games and exercises as important either to improving their understanding of the impact of their behaviours or in bringing up issues for thought and discussion.

> *You know you need to sit down and discuss things and some of the games although you thought oh this is a bit naff, actually they were quite good fun and it got you thinking and even though there were things that perhaps you knew about again it's bringing it* [to the forefront of your mind] (P.29)

Participants found that they learned a lot from the games in which they tried to work out what changes a fictional family should make. Because participants related to the situations and explored the issues for the fictional family they then moved on to think about what they might do in their own lives.

> *It allowed you to visualise the impact of what, the change that you were making and it allowed you to access that information and think about OK if I did this then I don't have to do that …. That I found useful and I just find that a good way of thinking about the information.* (P.22)

Five participants mentioned that breaking the issues into areas and concentrating on these areas allowed them to make changes. Participants felt that segmenting the issue made it easier to focus on the information about each area, and it also helped participants identify where they could most usefully make changes.

> *I think that has helped me in general and for my own personal change to my carbon I think just having to spend some time on each little area during the*

session and then having homework to do, think about it on my own time... Breaking it down like that was really helpful. (P.35)

Even some participants who did not think their understanding had increased as a result of participating in a Footpaths group found this approach to looking at the information was helpful in identifying where to make changes.

I think the difficulty has always been for me to know what to focus on and I think the Footpaths process is quite good in that sense because it breaks your life down into sections and you can see that your house heating is a big proportion of your footprint, say. (P.7)

The main element which participants thought helped them explore information was discussion, both in the discussion sessions and following on from games and exercises. Participants described the importance of the opportunity to discuss information with others as important to improving understanding and helping to make changes for two reasons. One was that it provided an opportunity to focus on issues and tease them out, and the other was that it provided an opportunity to learn from others. Learning from others includes both the exchange of information about what worked including how others went about doing things and modelling behaviour.

The good point about working in that group is that you can see people who have already done it so there's me thinking I would really like to install solar, PV solar panels on my roof and A's done it and he tells you about how much it cost him, and he tells you about what kind of benefits he's getting at the moment and he tells you about the drawbacks because he's done it and that was the beauty of that but there were people at various stages within that group and had done some things and had done others. (P.40)

The learning from others did not always require other people to have already done things, the discussion of things that people would like to do also helped some participants to think more about what they might do.

Also each person in the group talked about things that they thought they would like to do or had done so we shared ideas and you take ideas from other people, don't you. (P.1)

This learning from others took the form of both acquiring information, and an affirmation that it would be possible to make changes because others had done so. This modelling aspect seemed to be very important to some people.

> *Yeah, just chatting to people, finding out what they do, yeah … If I'd read the book on my own I might not have done it.* (P.27)

> *I think it was probably the fact that others were doing stuff that I thought I could do that quite easily, recycling all the kitchen waste or....I could do that, yeah* (P.40)

Teasing out the issues with other people helped some participants feel more able to make changes because it helped "*get my brain moving on it more and yeah...I feel more capable of doing some of those things that I knew already*" (P..35). The comments also made it clear that this way of acquiring information was more effective than other methods for many participants.

> *My actual way of functioning in the world is very practically based, hands on verbal exploration of stuff, and sharing ideas with other people, teasing things out, I work in a problem solving way and need others to do that with and so the footpaths group allowed all of that, whether it was playing the games hands on. It wasn't theory, I can sit and research on Google all day but I might have to do 15 minutes, park what I've learned, go away, come back to it, go away, come back to it cause, whereas 15 minutes in a group and I probably have 4 or 5 times as much information as 15 minutes sitting on my own and the opportunity to tease it out.* (P.20)

Sort exercise

In response to the sort exercise 15 of the 24 interviewees listed ideas, information or learning more as one of the factors in the Footpaths programme that influenced them with six interviewees mentioning it more than once. 19 of the 24 interviewees listed discussion, seeing and hearing other's experiences, being made to think, or breaking down the issue into areas as one of the factors in the Footpaths programme that influenced them with 11 interviewees mentioning it more than once. Only two interviewees did not include any items related to model building in their responses to

the sort exercise. When ranked from most to least influential, half of the statements which were ranked as most influential were related to model building.

5.3.2 Being effective

The being effective domain of the RPM contains three major themes – competence, confidence and clear-headedness. Many participants thought that their competence increased as a result of participating in Footpaths and they felt clearer about the issues and more able to take action,

Observations

The Footpaths programme addressed the need for increased competence and confidence explicitly through discussions of barriers to change and problem-solving exercises and implicitly through providing information, building skills through playing games, and providing a forum for participants to learn what was possible from each other. Participants were concerned about their lack of competence as well as the lack of information. At the start of the group some participants were concerned that they might not find it possible to apply new information to their lives. Many participants talked about depression, fear and guilt and how the issue made them feel bad. Some were concerned that they weren't doing enough, or that they weren't doing the 'right' things. Participants were unsure of what would be effective, how to decide what changes to make, how to make the changes. Participants appeared to have feelings of frustration and helplessness around choosing changes, finding products and workmen, and understanding information. Participants were worried that changes to their lives might distance them from friends and family because of their altered lifestyles. Participants were also worried about how to strike a balance with family members who did not think it was important to make changes.

Participants reported that they felt more able to take action as a result of ideas suggested by others, reflecting increased competence resulting from improved mental models of appropriate action. The food game provided participants with a new framework for considering the carbon impact of food and participants reported being able to affect their food footprint as a result. The home energy and travel games specifically provided participants with opportunities for building competence. In the

travel game participants found the process of negotiating flights against regular commuting, and social and sporting engagements was exciting and surprisingly positive. One participant was excited about exploring this approach in their own life:

> *you could do something like this with your family…you could do something like this…you would need to work out your journeys.* (P.34)

Another participant suggested that a web page with a pie chart like this for your whole life would be useful, because it presented the information in an easy to understand way and allowed you to explore the effect of different changes in a virtual world.

Responses to the general questions - effectiveness

The being effective domain of the RPM contains three major themes – improving competence, increasing confidence, and achieving clear-headedness. Eight of the interviewees mentioned one of these aspects as something they were hoping to get from the Footpaths group. Both improving competence and managing information were important to some participants, but increasing confidence was not mentioned as a motivation or as an outcome.

Improving competence

Eight of the twenty-four participants mentioned wanting to improve their competence as a motivation for joining a Footpaths group. Competence is closely linked in some cases to opportunities for exploration.

> *Because I could use it in a practical way in my everyday life, having just got something like an allotment which I hadn't ever done any gardening or anything before so it was a good way of meeting other people who had some gardening experience and gaining a little bit that way as well* (P.38)

Achieve clear-headedness

Two participants were hoping that participating in Footpaths would help them to pay attention to the issues, either through spending time on them, or by helping them to keep focused on them *"just to keep it in my mind of actually this is what I need to do, this is what I can do"* (P.54).

Responses to RPM focused interview questions - effectiveness

Responses to the questions focusing on RPM themes revealed that competence and clear-headedness, particularly the issue of managing information flow, were important issues for participants. Almost all the interviewees (22 out of 24) mentioned improved competence as a result of participating in a Footpaths group, and both achieving greater clear-headedness and increasing confidence were mentioned by three-quarters of the interviewees. As a specific question was asked about changes in confidence following participation in Footpaths the frequency of occurrence of confidence may be larger than would have arisen without prompting. No specific questions were asked about competence or about clear-headedness. These results contrast with the motivations for joining Footpaths where only 8 participants joined with the expectation of increasing competence, only two expressed a concern with managing information and none expressed an increase in confidence as an expected outcome from the groups.

Competence

Increased competence was an important outcome for most of the interviewees and they mentioned a variety of ways in which participating in Footpaths helped to increase their feelings of competence. The focus not only on information provided in the Footpaths sessions but also on how to apply that information to everyday lives was very important to interviewees and was instrumental to their ability to make changes.

> *We always talked about the practical and realistic ways we could apply it to our lives. That was one of the areas that always was discussed, it was never left at the theoretical level.* (P.1)

The games were particularly helpful to some participants in building competence because they allowed them to try out different solutions to problems. The discussion around what changes to make helped participants to see what they could do.

> *I think it got us to talk about what we were doing and then how we were going to, thinking about things … our sort of scenarios about how we were going to tackle those things were, that was an interesting thing.* (P.29)

A number of interviewees talked about their feelings of powerlessness and being overwhelmed by the issues before participating in Footpaths, though there were

different reactions to these feelings ranging from feeling "*Fairly stuck really, fairly powerless, also quite unmotivated"* (P.35) to "*Confused and sometimes overwhelmed but a bit of a nagging feeling that I really need to keep trying to do something about it*." (P.22).

Increasing competence was linked to both having more information and having a chance to explore that information and decide what would be useful, knowing both what the choices were and that it was possible to choose to do things differently.

> *Just the information and that, cause you know the choices that you are making, because you've got that information you can make more choices upon the information that you've got you can actually, I'm not very good with words so, you can actually pick out what you want from all these new things and you know you haven't got just because that's the way things have always been done, you know you can actually, there is another choice out there*. (P.2)

Overall participants thought that they knew more and therefore were more competent to take action "*I think it made me feel it was easier to apply the information because fundamentally the way I see it is applying the information is making the changes*" (P.15)

Confidence

Participants were asked specifically whether they felt more confident about reducing their carbon footprints after they finished the groups than they did before they started. Three-quarters of interviewees indicated that they did feel more confident. Interviewees who thought their confidence had increased linked their increase in confidence to having reliable information, to feeling more motivated, and to feeling less alone, knowing that there were others who wanted to make changes too.

> *Probably yes, I mean I felt fairly confident anyway but I think I am clearer about particularly things that I didn't know much about or I hadn't bothered with* (P.51)

> *Yes, I do feel more confident.... Because I feel more motivated to and therefore I know what changes need to be made, I'm more likely to get round to doing some of them.* (P.35)

Six interviewees did not feel that their confidence had increased. These participants all felt that they were confident that they could make changes before taking part in Footpaths, and they identified improved information and greater feelings of incentive rather than confidence as a result of being in Footpaths.

> *More confident... more knowledgeable I would say, so better informed, more correctly informed, confidence, no I don't think it's changed.* (P.10)

> *I think I'm repeating myself a bit, I think I've got more conviction that I need to do it. I don't know that I was lacking confidence*. (P.21)

Clear-headedness

Being clear-headed is important for absorbing and using information. Two themes emerged from the interviews which seemed to relate to achieving clear-headedness. The first was the concept of focusing on the issues and giving them time. This could be seen as paying attention to the issues, which is made possible by participating in Footpaths in a number of ways. First, people mentioned that committing to Footpaths meant that they allocated time and mental space to the issues. Second, making that commitment helped people to refocus on the issues which they thought were important but had not necessarily made a priority. Finally, the format of Footpaths allowed people to focus on the issues with other people in discussion, and by themselves between sessions.

Two participants joined Footpaths hoping that it would help them to pay attention to the issues, either through spending time on them, or by helping them to keep focused on them. These participants were aware that it was difficult to find the time to set aside to think about the issues and wanted a structure to support them.

> *Having the discipline of a two hour session that's going to focus on a subject I think I was looking forward to because I thought that might take me further and I would learn more* (P.10)

Allocating time and mental space to the issues was seen as very important by a number of interviewees. Participants thought that making a specific decision to set aside time in their lives to engage with reducing their carbon footprint was important in ensuring that they would think about it.

> *I think I want to add as well, allocating time. Because you know life is, you have so many things that you want to do that if I put on the calendar I'm going to spend an hour doing something there's more chance that I'm going to do it than if I didn't write it on the calendar…..* (P.1)

Not only did setting aside the time ensure that time was spent considering the issues, but the act of setting aside the time affected how interviewees thought about the issues and the priority it had in their thinking and in their lives.

> *The mental space that it gave me, so dedicating time to thinking about it, just the fact of doing that helped me to change* (P.15)

> *The most important thing was giving me, reminding me, that this actually is quite an important issue and that it is worthwhile spending some time thinking about it* (P.34)

> *I really want to do that, but actually not creating the space and time to do it whereas attending this* [the Footpaths group] *has actually made me think you are calling it a priority so why aren't you doing something about it* (P.21)

Being involved with Footpaths seems to have encouraged participants to focus on the issues, and to pay more attention to the issues even outside of the group sessions.

> *We have made changes, yes and again it just brings it to the forefront of your mind so you are thinking about it because I think that's the problem,* (P.29)

The second theme emerging from the interviews and closely linked with achieving clear-headedness was that of enjoyment. Many of the participants described elements of Footpaths as fun. Things that are enjoyable grab attention, make learning more memorable, and aid in restoration from mental fatigue.

> *And I enjoyed the times, the fun things in the group, often that would be the moving exercises or when we had fun playing the travel game, that was fun, times when we were laughing*. (P.15)

> *I think just having fun together, and having laughter together because people did laugh quite a lot and people talked about themselves and opened up about themselves,* (P.54)

Results of sort exercise - effectiveness

In response to the sort exercise, seven of the twenty four interviewees listed support for improved competence as one of the elements of the Footpaths programme which influenced them to make changes with two interviewees mentioning it more than once. None of the interviewees listed confidence as an important factor in the sort exercise, while five interviewees listed fun or laughter as being part of what influenced them and eight interviewees listed mental space, time and focus. When ranked from most to least influential, none of the statements which were ranked as most influential were related to effectiveness, while one-quarter of the second most influential were related to effectiveness.

5.3.3 Meaningful action

The meaningful action domain of the RPM contains three major themes – making a difference, respect, and participation. Many participants thought that they were able to make a difference to their lives as a result of being in a Footpaths group. Footpaths provided them with tools, information and motivation for making changes and participants had made changes and were feeling positive about making these changes.

Observations

The overall focus of the Footpaths programme is meaningful action; essentially its purpose is to help participants reduce their carbon footprints, and meaningful action was mentioned by almost all the participants at the first session as a reason for joining Footpaths. The structure of the sessions encouraged participation in the group processes, and the homework encouraged participants to look for actions that they could take to make a difference to their carbon footprint. Participants discussed changes they were considering or trying out during discussion sessions, and reported back on changes that were successful and not successful for them.

Responses to general questions – meaningful action

The meaningful action domain of the RPM contains three major themes – making a difference, respect, and working together. Nine of the twenty-four participants mentioned either wanting to make a difference, a concern with being respected, or a

desire to work together. Two of the interviewees were hoping to make a difference by helping others to reduce their carbon footprints "*I also was hoping that I would help other people do that".* (P.15)

One participant hoped to gain respect *"The satisfaction of actually being a good example to other people."* (P.35), while another was worried that she would not be respected *"Moaned at…for not being a vegetarian which I hasten to add I wasn't."* (P.38)

Seven people indicated an interest in working as part of a group. This was related to but separate from wanting to meet people for social reasons which is one of the emergent themes identified "*a support network, from feeling it was just me and feeling quite a vacuum trying to do it on my own"* (P.21).

Responses to focused questions – meaningful action

Making a difference

The difficulty with making a difference before the group started was identified by a number of participants, "*you just thought well you know I can't do this and I can't do that so where do I start"* (P.40). Participation in Footpaths seems to have addressed this issue for many with interviewees identifying a range of activities that they were doing as a result of Footpaths which they felt made a difference. Different interviewees identified different areas in which they had made changes.

> *I'm learning vegetable gardening which I've been aiming at, um I've been learning it for a while, but doing it more systematically now. Reading my meter, not on a frequent basis, but reading it whereas I never did it before and that's.... research says that that makes people more aware of what they use, doesn't it. Car sharing – I'm going to be car sharing soon, veg box.* (P.1)

> *Yeah, my food's changed, my food patterns have changed, my travel choices on a day to day basis have changed, I'm more motivated to keep my travel footprint low, and specific things around food like we are eating a lot more seasonally and having a lot less imported veg and stuff like that yeah and I've made some specific changes in my food patterns* (P.10)

Some interviewees did not feel that they had done very much as a result of participating in Footpaths, but even those who did not feel that their lives had changed substantially felt positive about what had changed.

> *There are things that I can do and I am doing and so it's a moving forward, it's not a going backward and it's not quite "it's all too much I can't be bothered let's forget it" so it is a moving forward in small steps in small ways*. (P.14)

Participants connected their ability to make changes to positive feelings. Identifying the changes they could make and implementing them was a very positive experience for some participants.

> *So I think it became very clear there were certain things I could do which would have an immediate impact on my footprint and I think via the group it was saying I should do this it would make me feel good, stop messing around and do it* (P.33)

A few people found that they were struggling with making a difference in some areas even though they felt that they were making a difference in other areas.

> *I'm probably a lot better than most but it's a quite difficult thing to get it down to even 4 tons a year and then one trip to America and I've completely doubled it. It's just incredible, so I find it kind of hopeless, frustrating* (P.51)

Another way interviewees reported that they were able to make a difference was by talking to other people outside Footpaths about the issues. Again participants found this kind of making a difference was a very positive experience

> *I feel really good about myself because of the few improvements I've made in my life …plus the fact that I can pass that on to other people.* (P.38)

Although participation in Footpaths appears to have encouraged interviewees to make changes in their lives a few participants would have liked more practical information, to allow them to make a bigger difference. "*more of that very practical, like if you wanted to insulate under your floor who would you go to, what would be the best thing to do so that you are not having to spend hours thinking what should I do, who should I go to*" (P.22)

Respect

About a third of the participants mentioned the importance of respect within the group in helping the group to function well, and several participants found the respect they received for what they were doing encouraged them to do more. "*I thought it was really nice, really balanced, very open and very sensitive to other people's feelings so it didn't feel kind of pressured or critical or anything like that"* (P.22). Several participants joined Footpaths with the hope of being a role model and found that role was rewarding *"The satisfaction of actually being a good example to other people."* (P.35). One participant was concerned that she wouldn't be respected but found that "*I was not made to feel out of place by all these other people. No, I was accepted for who I was"* (P.33).

Working together

The importance of working together in a group was mentioned by two-thirds of the interviewees. Working together, the chance to talk with other people, and not feeling alone with the issue or peculiar were all important. These were related to but separate from wanting to meet people for social reasons which was one of the emergent themes identified.

For some interviewees the importance of the chance to explore the issues with other people was crucial to their ability to then take meaningful action. This was related to being able to move from understanding to individual action.

> *It's hard to separate out the method from the outcome. So for me the most important, the method, being in that community of people for a period of time looking at something specific allowed me to explore the things that I wanted to explore, take them away and implement them*. (P.20)

For other interviewees the important element was that of having others to take action with, and the working together was seen as something that would extend beyond the period of the group sessions.

> *I thought I would get a group of people in my area who I could do ongoing stuff with which would help me to reduce my footprint and would help them to reduce theirs* (P.6).

Results of sort exercise – meaningful action

In response to the sort exercise, five interviewees identified making a difference as an important part of the Footpaths process with three interviewees mentioning it more than once. Eighteen interviewees listed working together, mostly expressing it as group support, sharing or not feeling alone. This was one of the most frequent themes in the sort exercise with eight interviewees mentioning working together more than once as an important influence. Six interviewees listed some aspect of respect or being listened to in the sort exercise with one person mentioning it more than once. When ranked from most to least influential, about a third of the statements which were ranked as most influential were related to meaningful action, while about one-quarter of the second most influential were related to meaningful action.

5.3.4 Emergent Themes - social contact, commitment to the group, motivation, and guilt

In addition to themes related to the three domains of the RPM model, a number of other themes emerged from the interviews which were important to participants in Footpaths. These were social contact, commitment to the group, motivation, and guilt. The importance of social contact and commitment to the group were related to but separate from the importance of working together.

Observations

Two main themes emerged from the analysis of the observations in addition to the RPM themes: social support and exploring feelings. Participants frequently talked within the sessions about the relief of being with a group of people who were concerned about the issues, and who wanted to make a difference. The group developed a warm and encouraging atmosphere which supported participants who were struggling over the possibility of change in their lives. Exploring feelings was an important part of some of the discussion sessions, and participants appeared to welcome the opportunity to speak about how hard they found the issues and how difficult it was to deal with the emotions of loss associated with making changes to their lives. Before discussing possible changes participants often seemed to need to examine these negative feelings.

Responses to general questions – emergent themes

Social contact

As well as the support of working in a group six people expressed an interest in purely social contact – meeting people and making friends. This is related to working with others, but only overlapped in two of the six people. It appeared to be a purely social motivation. *" I want to be a bit more social so part of it was selfish cause I wanted to meet some people and have a bit of social side of it"* (P.29).

Motivation

Two people were specifically looking for a bit of a push to make changes *"I thought it might give me a bit of motivation and a bit of a kick to do things that I was struggling doing" (*P.15).

Responses to focused questions – emergent themes

Social contact

As well as the support of working in a group two-thirds of the interviewees expressed an interest in purely social contact, getting out of the house and meeting new people. It appeared to be a purely social motivation about getting to know people and being with people that they liked separately from the notion of working with others.

> *I want to be a bit more social so part of it was selfish cause I wanted to meet some people and have a bit of social side of it* (P.29).

Some interviewees were surprised by how much they appreciated the social contact "*Yeah, I enjoyed hanging out with the people in the group more than I expected to...So yeah that was something I didn't expect*" p.10. Some participants who were focused on learning more and making changes found that the social contact was an added benefit "*I really enjoyed getting to know people who I didn't know, that was a real bonus* " p.15

Commitment to group

Five people felt that commitment to their Footpaths group affected their behaviour. This was not related to learning, but to a feeling of loyalty to the group which may be related to group norms.

> *So one of the things that the group, a couple of people talking about turning the thermostat down, something that I was quite reluctant to do for quite a long time and you know my thermostat is down a couple of notches, it generally doesn't go above 18 anymore whereas it would be up to 22 previously and I would wander around the house in shorts as a friend of mine commented on recently, oh that's a big shift in you if you've got your thermostat down to 18 and something I hadn't thought about or rung up as a success of that group, I just did it, because there was a loyalty to the group to bring the thermostat down* (P.20).

> *I've been looking at one or two holiday things but they all, you have to go on a plane and I'm thinking that's no good how can I tell Friends that I am going on holiday and that it is going to involve an airplane journey. I'm going to feel really bad about having to do that especially as one of the members in our group she had the same problem and she decided not to take her young family to, where were they going, I think they were going to go to Germany to see some lovely market thing and have a really nice time and she felt she couldn't because we shouldn't be making plane journeys and it was just going to be so complicated to sort out trains.* (P.34)

Motivation

A number of interviewees felt that an important aspect of participating in Footpaths was the added motivation it gave them to make changes in their lives.

> *I felt like I knew which directions I should be going in previously but I wasn't sure how to actually get round to doing anything*. (P.35)

Two participants were aware that they needed something to help them move forward and mentioned this as a reason for joining Footpaths. "*I hoped that it would give me a push."* P.5. This was not related to needing more information but simply to needing help in getting moving on things that they wanted to do. *"I thought it might give me a bit of motivation and a bit of a kick to do things that I was struggling doing"*. (P.15)

Participants found that Footpaths helped with this need for greater motivation, with the word push appearing a number of times, suggesting that people need to overcome some

kind of inertia to move forward. "*I got some … a collective, sort of a bit of a push to do some things which I had intended to do but had not quite got round to doing*." (P.33)

Guilt

Five people mentioned that as a result of being in a Footpaths group they now felt more guilty about things they were doing or not doing "*there's a part of me that feels overwhelmed and guilty about what I'm not managing to do*" (P.15). Several participants linked guilt with awareness and noted that this guilt was not necessarily a bad thing as it could be a first step towards making changes.

> *It has changed, what's happened is now I'm feeling guilty. It hasn't made me do an awful lot of things differently but it has made me feel guilty about some of the things I am doing which is not necessarily, which is not a bad step. Perhaps guilt is too strong a word, I'm certainly more aware, more aware of what I am doing and thinking well maybe I shouldn't be doing these things, or things that I could do.* (P.34)

Several participants thought that Footpaths had helped them to feel less guilty and that the removal of guilt made it easier to move forward "*when you take the pain away it actually becomes easier to do it, because you kind of remove the guilt that tends to get in the way,"* (P.20)

<u>Sort exercise – emergent themes</u>

Three interviewees felt that their commitment to the group was an important influence in changing their behaviour with one person mentioning it twice. Five interviewees thought that social contact itself as opposed to working with a group was an important element of the Footpaths programme for them, with one person mentioning it twice. Only one person listed the lowering of guilt to be an important element of the Footpaths programme. Eight interviewees felt that increased motivation was an important element in the Footpaths programme, with one person mentioning it twice.

5.4 Discussion of qualitative results

The qualitative component of this research addressed two of the research questions proposed at the end of Chapter 2. The implications of the qualitative analysis for these questions are addressed here by question.

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*

The data from observations of group sessions suggested that the Footpaths group sessions do provide opportunities for building and extending mental models and for increasing feelings of effectiveness, and that they encourage meaningful action. The variety of approaches to presenting and exploring information through games, exercises and discussion appears to have allowed participants to actively engage with information and to increase their understanding. The games encouraged participants to experiment with different solutions to reducing household and transport energy use and the fact that participants enjoyed the games may have helped them to remain focused on the issues. Modelling possible behaviours for the fictional families in the games appears to have increased participants' belief that they could make changes to their lives to reduce their carbon footprints, increasing both confidence and competence. The framework for considering the carbon impact of food provided by the food game also appears to have increased participants' competence in controlling their food footprints. The discussion sessions allowed participants to share information with each other to achieve clarity on issues that they had been uncertain about previously and hearing what other people did increased participants' beliefs that they could make the same changes. Participants were encouraged to take meaningful action through identifying specific actions they could take in the group discussions, as well as by setting targets in the homework.

The data from the interviews also suggests that the Footpaths groups provide an environment which facilitates model building, effectiveness and meaningful action. RPM related themes were present in responses to the first two questions in the interviews which contained no reference to any RPM related concepts but asked simply what participants had hoped to get from participating in a Footpaths group, and what they had gotten (Table 5.5). Interviewees' responses to these questions included themes

Table 5.5 Summary of themes occurring in responses to general interview questions and questions exploring RPM themes (N=24)

		Number of interviews in which theme was present		Overall frequency of occurrence of theme	
	Theme	General questions	RPM questions	General questions	RPM questions
Model Building	Improving understanding	15	24	19	101
	Exploration	10	24	12	115
Effectiveness	Competence	8	22	9	48
	Confidence	0	18	0	20
	Managing information flow	2	18	2	36
Meaningful Action	Making a difference	2	24	2	61
	Respect	2	7	2	9
	Working together	7	15	7	34
Emergent Themes	Social contact	6	14	7	24
	Commitment to group	0	5	0	6
	Motivation	2	10	2	28
	Guilt	0	5	0	6

from all three domains of the RPM. More interviewees mentioned themes connected with the desire to build and extend mental models than to be more effective or to take meaningful action, but all three domains were mentioned by some of the participants and all the themes were present in the responses to these general questions except for increasing confidence. Two emergent themes were also identified, social contact and motivation.

Responses to questions which focused on RPM themes reflected the same concerns as those identified in responses to the first two questions. All of the themes present in responses to the first two questions were also identified in the responses to the remainder of the questions (Table 5.5). Two additional themes were found in the remainder of the questions, each mentioned by five of the participants, commitment to the group and guilt. Confidence appears as a theme in the remainder of the questions but appears only in response to a direct question about confidence for all but one interviewee. All the themes occurred more commonly in responses to the more focused questions reflecting the larger number of questions and the greater focus on specific issues. Improving understanding and exploration were the most common themes occurring in responses to all the questions, with competence as the third most important theme.

The three domains were often interlinked in answers to interview questions, for example the themes of information, exploration, managing information flow, and working together are all contained within:

> *I wasn't sure what I would get but what I hoped was more insight into the whole sustainable living, the idea of sustainable living. Ideas about what I could do, I wanted sources of information, because that is one of the things that I struggle with is getting processable lumps of information as opposed to 3000 web sites on Google. Oh God which one do I go to so that's what I was hoping to get from it, a clearer picture, and a kind of group support I guess to explore it.* (P.20)

And the themes exploration, competence and working together are interwoven in:

> *I think I pretty well expected what I got on the whole which was to help me look more closely at my own individual carbon footprint and how to reduce that and to be a support network, from feeling it was just me and feeling quite a vacuum trying to do it on my own (*P.21).

As Footpaths was marketed as a programme to help people learn how to reduce their carbon footprint it is perhaps unsurprising that a desire to increase understanding and explore issues around carbon footprints emerged as the most prevalent themes, with a desire to improve competence as the third most common theme. Working together and

social contact were also important for people when thinking what they expected to get from participating in Footpaths and in reflecting on what they did get.

Overall the results from the qualitative analysis suggest that improving understanding was an issue of concern to participants and an outcome of participating in a Footpaths group. There was a particular emphasis on practical information. While participants wanted to increase their understanding because they were interested in the issue and wanted to know more, they were driven particularly by a desire for increasing their understanding of changes they could make which would reduce their carbon footprints.

Exploration of information was also of primary importance to participants both as a motivation for joining Footpaths and as an outcome. Participants saw the opportunity to explore information as an important way of increasing their understanding of both what changes could be made and of what changes they personally could or would be willing to make. Discussion with others of information from the Footpaths programme, other people's experiences, and possible choices that could be made, particularly arising from the games, provided opportunities for building and extending mental models of lower carbon lifestyles. Breaking the subject down into areas and the detailed exploration of their own footprints helped many participants understand better what changes they could make and empowered them to make those changes. The walking into the future exercise appeared to affect participants in a powerful way by allowing them to visualise alternate futures, and other exercises and games also seemed to allow participants to visualise changes they could make and so believe that they were possible.

Improved competence was fostered by the Footpaths programme through exploration of information and considering possible actions. Participants who felt "stuck" before participating in the Footpaths group reported that they were more able to do things and were doing more as a result of feeling more able to do so. On the other hand confidence did not seem to be an important issue to participants.

Achieving clear-headedness was an issue of concern to participants and an outcome of participating in a Footpaths group. There was an awareness among participants that it was necessary to allocate mental space and time to the issue of reducing their carbon footprints. Simply participating in Footpaths helped participants to prioritise carbon reduction and to keep their focus on the issues. Being part of a Footpaths group helped

to keep the issues within the consciousness between meetings and that was important to participants in achieving clear-headedness.

Finally, participants wanted to make a difference to their carbon footprints, and they believed that being in Footpaths helped them to do that. This was facilitated by the information provided and the chance to explore it, but much of that exploration was tied up with working with others, talking to other people, and sharing difficulties. Respect and being listened to were concerns of some participants before the group started, and these were reported as important to the success of the Footpaths group in supporting people to make changes or think about making changes in their lives.

5. *What other elements of the environment provided by, group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?*

In addition to themes related to the RPM, the social contact provided by the meetings appeared to be important to participants who felt supported by being with other like-minded people. Some interviewees had joined Footpaths hoping for or expecting social benefit, but some others were surprised at how much they enjoyed the social side of the group, beyond the feeling of participation with others towards a specific goal. There was a commitment to the group which was mentioned by some interviewees which suggests that the social norms within the group affected their behaviour. The results indicate that participants were very grateful to be with a group of like-minded people and that they found being in that group supported them to think about change.

Simply being involved with Footpaths seems to have provided some interviewees with the motivation to make changes which they believed they should make before they joined Footpaths. Something about the group experience seemed to provide a "push" to make changes. This was identified by some as having made a commitment to change by choosing to join a Footpaths group. Others identified a feeling of guilt as a result of participating in Footpaths which they thought might prove to motivate them towards changing their behaviour in the future.

Chapter 6: Participant Level Analysis of Qualitative and Quantitative Data

6.1 Introduction

The previous two chapters considered the quantitative and qualitative data from the Footpaths project looking for patterns across the whole data set. In order to examine further how participation in Footpaths affected the individual participants this chapter explores the qualitative and quantitative data related to the 13 participants for whom full quantitative and qualitative data were available. These participants all returned questionnaires and carbon footprint forms at all three times, were interviewed, and provided data on emissions calculated from recorded energy use at T2 and T3 for at least one energy use category, either household, car travel or air travel. These 13 participants were drawn from all five of the first round groups which were the only groups that provided interviewees. Only interviewees with emissions data from recorded energy use were included to allow confirmation of reduction in carbon footprint size through comparison with objectively recorded energy use.

This chapter attempts to extend understanding of the relationship between the environment provided by the Footpaths groups, the characteristics of the participants, and changes in carbon footprint and frequency of pro-environmental behaviour. This understanding is directed at exploring further three of the research questions posed at the end of Chapter 2 through integrating quantitative and qualitative data from these 13 participants.

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*
4. *Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased understanding, effectiveness and potential for meaningful action?*
5. *What other elements of the environment provided by group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?*

6.2 Characteristics of participants

Participants ranged in age from between 20 and 29 to between 60 and 69, and their household incomes ranged from less than £10,399 to between £50,000 and £59,000. Two were men and eleven were women. Qualifications ranged from no qualifications to above degree level with eleven of the thirteen educated to degree level or above. Household number varied from one to four and household tenure included rented, owned with a mortgage, and owned outright. Questionnaire responses indicated that two of the participants joined Footpaths to be involved in something in their community, two joined to find out more about climate change, and nine joined to help reduce their carbon footprint. There was no significance difference between the socio-demographic characteristics of these thirteen participants and the overall Footpaths population, nor were world-view and attitude scores significantly different.

6.3 Grouping participants based on interview data

A number of patterns emerged from the data provided by the thirteen participants. The interview data for these thirteen were reanalysed and six clear high level themes emerged based on responses to the question "what were you hoping to get from participating in a Footpaths group?" These themes had a clear relationship to themes identified in the analysis of the qualitative data for all interviewees. The six themes identified and the themes they are related to are:

- gather information – understanding (model building)
- find out what I could do – exploration (model building)
- focused time and discussion – achieving clear-headedness (being effective)
- group support – working together (meaningful action)
- wanting a community – participation (meaningful action)
- push/challenge – motivation (other)

One or two themes were central to most participants' responses and analysis of the pattern of responses yielded four groupings of participants based on their primary focus for participating in Footpaths. These groups were:

- information and group support
- wanting a community

- focused time and discussion
- push/challenge

In addition there were two participants who did not provide a clear answer to what they were hoping to get from participating in a Footpaths group (Table 6.1).

Table 6.1 Groupings of participants based on initial questions and on consideration of full interview responses

Grouping based on initial question [1]		Final grouping based on interview responses	
Group themes	Participant number	Group themes	Participant number
Information and Group support	7, 9, 20, 29, 33, 34	Information and Meeting people	7, 9, 29
		Information and Group support	20, 33, 34
Wanting a community	6, 35	Wanting a community	6
Focused time and discussion	10, 21	Focused time and discussion	10, 21, 15, 35
Push/challenge	15	Change is difficult	12, 51
No clear answer	12, 51		

[1] *What were you hoping to get from participating in a Footpaths group?*

The majority of the participants were initially placed in the *information and group support* group. Two of the other three groups each initially included two participants: *wanting a community,* and *focused time and discussion*. The *push/challenge* group had one participant. Analysis of responses to the rest of the interview questions largely confirmed these groupings but the group focused on *information and group support* sub-divided into participants whose interviews primarily discussed their enjoyment of the social aspects of the group, and those who were more concerned with support in

making changes (Table 6.1). Also one of the two participants originally assigned to the *wanting a community* group and the participant assigned to the *push/challenge* group were both reassigned to the *focused time and discussion* group on the basis of responses to the remainder of the interview questions. Analysis of the rest of the interview responses from the two participants who did not provide a clear reason for joining Footpaths revealed a common theme that *change was difficult.*

6.3.1 Information and Meeting People

Six participants primarily hoped to get information and support in making changes from participating in a Footpaths group. These six were divided between those who wanted a support group to explore changes with and those who were motivated more by wanting "*to meet some people and have a bit of social side of it"* (P.29).

The three participants who were hoping specifically for a "*social benefit*" (P.7) from the group emphasised the importance of the social side in their interviews. Two of these participants thought they were already well-informed before joining Footpaths and much of the information provided by Footpaths was already known to them. The third participant did not feel that she was well-informed before starting Footpaths and felt overwhelmed by the information she now has as a result of participating in Footpaths. The sort exercise results for two of these participants, one of whom felt well-informed and one of whom did not, emphasised camaraderie and group support with few references to information, reflecting the social aspects of the group. The sort exercise for the third participant focused on information and motivation rather than social interaction, although she considered herself to be well-informed before starting and stated "*I don't think I learned very much in terms of hard facts"* (P.7).

The starting carbon footprints for these participants were 9.79, 13.27, and 10.10 tonnes of CO_2, two of which were just below the average for Footpaths' participants, and one of which was above (Table 6.2, participants 7, 9 and 29). Carbon footprints for all three increased from T1 to T3, with one increasing her footprint by 70% and two participants increasing their footprint by 7%. The frequency of their pro-environmental behaviour stayed the same or decreased over the same time. Their scores for model building, effectiveness, confidence and competence all remained the same or decreased.

Table 6.2 Changes in scores between T1 and T3. [1]

Grouping	Participant	Initial carbon footprint in tonnes of CO_2	Percentage reduction in carbon footprint	Increase in pro-environmental behaviour	Model building	Effectiveness	Confidence	Competence
Information and meeting people	7	9.79	-70	.00	.00	.00	-1.30	-.15
	9	13.27	-7	-.86	-.67	-.50	-.80	-1.57
	29	10.10	-7	-.29	-.33	.00	-.40	.55
Information and group support	20	14.67	**45**	**.57**	**1.33**	**1.50**	.00	**1.60**
	33	13.43	**51**	**.14**	**1.00**	**.75**	**.80**	**.20**
	34	11.02	**17**	**.14**	**.33**	.00	-1.15	-.20
Wanting a community	6	5.03	**8**	**.36**	**1.42**	-.25	**1.20**	-.20
Focused time and attention	10	6.81	**8**	**.07**	**1.00**	**.25**	**1.90**	**.45**
	15	10.00	**39**	**.29**	.00	.00	**.20**	**1.30**
	35	5.67	**20**	**.36**	-1.00	**1.00**	-.20	.00
	21	6.31	**8**	**.29**	**.67**	**1.00**	**2.30**	**.90**
Change is difficult	12	8.61	-2	**.21**	-.33	**.25**	**.70**	**.05**
	51	6.18	-7	-.21	-.33	-.25	**.30**	**.10**

[1] *Positive scores are shown in bold and cases where carbon footprint decreased are highlighted in blue*

6.3.2 Information and Group Support

The three participants who emphasised group support rather than socialising placed less emphasis in their interviews on meeting people and more emphasis on working with others on the issues. They felt that Footpaths provided good information which increased their understanding, and they valued the group experience for providing an opportunity to explore the information with others. "*being in that community of people for a period of time looking at something specific allowed me to explore the things that I wanted to explore, take them away, and implement them*" (P. 20). They felt they had

increased their understanding as a result of participating in Footpaths through the information gathered from discussion with others and from the handbook "*I got some detailed information to go with the kind of general things I had picked up"* (P. 33). This group emphasised the importance of the information sources they had been made aware of as well as the importance of learning from others. The sort exercise results from these participants focused on information and support.

Quantitative results for these participants indicate that all three reduced their carbon footprints and increased their pro-environmental behaviour. Initial carbon footprints were 14.67, 13.43 and 11.01 tonnes of CO_2, which were all higher than the average initial footprint for all Footpaths' participants (Table 6.2, participants 20, 33 and 34). Carbon footprint reductions were 17%, 45%, and 51% for these participants. The participant with a reduction of 17% in carbon footprint had an increased score in model building while her score in effectiveness was unchanged and her confidence and competence reduced. The participant with the 45% reduction in carbon footprint had increased scores in model building, effectiveness, confidence and competence. The participant with the largest reduction in carbon footprint had increased scores in model building, effectiveness and competence, and an unchanged score in confidence.

6.3.3 Wanting a community

One participant who joined Footpaths hoping to build a community of people to work with on an ongoing basis felt that she found such a community. She felt that participation in Footpaths had helped her to make changes and felt that working with a group facilitated change. New information was not particularly important to her but the results from the sort exercise supported the importance of having a local group and working with others towards concrete ends

This participant reduced her carbon footprint between T1 and T3 by 8% from an initial carbon footprint of 5.03 tonnes of CO_2, about half of the average for Footpaths' participants, and she increased her pro-environmental behaviour(Table 6.2, participant 6). She also had increased scores for model building and confidence, and decreased scores for effectiveness and competence.

6.3.4 Focused Time and Discussion

Two participants were primarily hoping for an opportunity to look closely at their own carbon footprints and to have a chance to discuss this with others, and a third emphasised the importance of focused time and discussion in the majority of her interview responses having joined hoping for a community. A fourth joined Footpaths hoping that it would motivate her to do more to reduce her carbon footprint, but her responses to the rest of the interview questions suggested that "*giving a bit of time and space to think about what I'm actually doing helped me …*[to make changes]" (P.15). These four participants all struggled with understanding information before Footpaths and felt that the process of spending time focusing on their own situation helped them to manage the information. This included both developing an understanding of their own footprints and understanding what changes they could be making to reduce their footprint. One participant felt that Footpaths created "*the space and time to do it"* (P.21) while another thought that "*having the discipline of a two hour session that's going to focus on a subject ….I thought that might take me further*"(P. 10). The third of these participants felt that the sessions motivated her to make changes through providing her with information and the opportunity to "*spend some time on each little area during the session....breaking it down like that was really helpful*" (P.35). The sort exercise results for these participants emphasised the importance of focusing on the issues, having mental space and time to consider the issues, and having a supportive environment.

The initial carbon footprints for these participants were below the average for Footpaths' participants at 6.81, 10.00, 6.31 and 5.67 tonnes of CO_2 and reduced by 8%, 39%, 8% and 20% from T1 to T3 (Table 6.2, participants 10, 15, 21 and 35). All four increased their pro-environmental behaviour. Scores for model building, effectiveness, confidence and competence all increased for participants 10 and 21, but for participant 15 only competence and confidence increased, and only effectiveness for participant 35.

6.3.5 Change is difficult

Two interviewees provided no clear answer about what they were hoping for from participating in a Footpaths group. Analysis of their responses to the rest of the questions suggests that they were concerned about information, but found that the information lacked clarity and that the issues were complex. They both thought that

they had made changes prior to becoming involved in Footpaths and that further change was difficult in the context of living with others: *"It was causing conflicts in our relationship and it seems crazy to have conflict over something which is important but it isn't as important as our relationship"(P. 51)*. Their concern for others was also in conflict with their desire to reduce their carbon footprint: "*you've got to love people and loving them is very often in conflict with actually reducing your carbon footprint"* (P.12). The sort exercise results from these participants stressed the social and fun side of the groups.

The initial carbon footprints for these two participants were below the Footpaths average at 8.61 and 6.18 tonnes of CO_2. Their carbon footprints increased by 2% and 7% between T1 And T3 and pro-environmental behaviour increased for the one with the smaller increase in carbon footprint size and decreased for the other (Table 6.3 participants 12 and 51). The participant with the 2% increase in carbon footprint had a decreased score for model building, but increases in effectiveness, confidence and competence. The participant with the 7% increase had decreased scores in model building, effectiveness, and confidence, and an increased score in competence.

6.4 Patterns from questionnaire and carbon footprint data

6.4.1 Changes in carbon footprint and energy use

Eight of the thirteen participants reduced their carbon footprints from T1 to T3 and nine of the participants increased their pro-environmental behaviour. Participants whose carbon footprint reduced from T1 to T3 all reported reductions in emissions from at least two areas of recorded energy use as well. All those who reduced their carbon footprint also reduced emissions calculated from actual air travel, and emissions calculated from either their actual car travel or recorded home energy use.

Five participants had carbon footprint reductions of greater than 10% between T1 and T3. All these participants were in the groups *information and group support* or *focused time and discussion.* (Table 6.3). Three other participants also reduced their carbon footprint but by less than 10%. These participants were in the groups *focussed time and discussion* or *community*.

Table 6.3 Changes in scores between T1 and T3. [1]

Grouping	Participant	Initial carbon footprint in tonnes of CO_2	Percentage reduction in carbon footprint	Increase in pro-environmental behaviour	Model building	Effectiveness	Confidence	Competence
Information and meeting people	7	9.79	-70	.00	.00	.00	-1.30	-.15
	9	13.27	-7	-.86	-.67	-.50	-.80	-1.57
	29	10.10	-7	-.29	-.33	.00	-.40	.55
Information and group support	20	14.67	**45**	**.57**	**1.33**	**1.50**	.00	**1.60**
	33	13.43	**51**	**.14**	**1.00**	**.75**	**.80**	**.20**
	34	11.02	**17**	**.14**	**.33**	.00	-1.15	-.20
Wanting a community	6	5.03	**8**	**.36**	**1.42**	-.25	**1.20**	-.20
Focused time and attention	10	6.81	**8**	**.07**	**1.00**	**.25**	**1.90**	**.45**
	15	10.00	**39**	**.29**	.00	.00	**.20**	**1.30**
	35	5.67	**20**	**.36**	-1.00	**1.00**	-.20	.00
	21	6.31	**8**	**.29**	**.67**	**1.00**	**2.30**	**.90**
Change is difficult	12	8.61	-2	**.21**	-.33	**.25**	**.70**	**.05**
	51	6.18	-7	-.21	-.33	-.25	**.30**	**.10**

[1] *Positive scores are shown in bold and cases where carbon footprint decreased are highlighted in blue*

Five participants increased their carbon footprint between T1 and T3, four by less than 8% and one by 70%, All these participants came from either the *information and meeting people* group or the *change is difficult* group.

6.4.2 Increases in frequency of pro-environmental behaviour

Frequency of pro-environmental behaviour at T1 ranged from 3.29 to 4.64 out of a possible score of 5. Changes in frequency of pro-environmental behaviour varied from an increase of.57 to a decrease of.86. In all but one case increases in pro-environmental behaviour were reflected by decreases in carbon footprint.

6.4.3 Changes in measures related to the RPM

All the participants whose model building score increased had reductions in their carbon footprints behaviour suggesting that an increase in model building may be a sufficient condition for a decrease in carbon footprint (Table 6.3). That is, if there is an increase model building there will also be a reduction in carbon footprint. Of the remaining two participants whose carbon footprints decreased, one had an unchanged model building score (participant 15), and one had a decreased score (participant 35) suggesting that an increase in model building is not a necessary condition for a decrease in carbon footprint. In other words there can be a reduction in carbon footprint size without an increase in model building.

All the participants whose model building score increased also increased their pro-environmental behaviour which may indicate that an increase in model building is a sufficient condition for an increase in pro-environmental behaviour. Again it is not a necessary condition as three participants had increased pro-environmental behaviour with decreased or unchanged model building. This suggests that if there is an increase in model building there will be an increase in pro-environmental behaviour, but there may be an increase in pro-environmental behaviour without an increase in model building.

All the participants whose effectiveness score increased also increased their pro-environmental behaviour, which may indicate that an increase in effectiveness is a sufficient condition for an increase in pro-environmental behaviour. It is not a necessary condition, however, as two participants whose pro-environmental behaviour increased had no change in their effectiveness score and one had a decreased score in effectiveness. This suggests that if there is an increase in effectiveness there will be an increase in pro-environmental behaviour, but that there may be increases in pro-environmental behaviour without increases in effectiveness.

None of the other variables whose change from T1 to T3 was statistically significant exhibit a similar pattern. Therefore neither increases in confidence nor competence can be considered either necessary or sufficient conditions for decreases in carbon footprint or increases in pro-environmental behaviour. (Table 6.3).

6.5 Interview themes and change in carbon footprint

Sub-themes identified previously in the analysis of interview data for the 13 participants were compared with changes in carbon footprint (Table 6.4). Participants whose carbon footprint decreased from T1 to T3 are highlighted in blue. Nine of the sub-themes are present for both reducers and non-reducers, two are present only for the reducers, and six are present only for non-reducers. The first sub-theme, *discussion*, is related to

Table 6.4 Important elements in Footpaths as identified in interviews by participant.[1]

Participant	7	9	12	29	51	6	10	15	20	21	33	34	35
Initial carbon footprint in tonnes of CO_2	9.8	13.3	8.6	10.1	6.2	5.0	6.8	10.0	14.7	6.3	13.4	11.0	5.7
Discussion	x	x	x	x	x	x	x	x	x		x		x
Push	x				x	x		x	x	x	x		x
Breaking into areas	x				x	x	x			x	x		x
Not alone					x	x	x	x	x	x		x	x
Front of mind	x			x				x		x			
Time and space/focus	x						x	x		x			
Prioritise					x				x		x	x	
Bigger picture				x				x					
Responsible	x	x	x		x	x		x	x	x	x	x	x
Support						x		x	x	x			
Respect										x	x	x	
Socialising	x	x	x	x	x								
Fun	x	x	x		x								
Lack of control	x	x	x	x									
The issues are complicated	x		x		x								
Conflict with other concerns	x		x	x	x								
Knew a lot before joining	x		x	x	x								

[1] *Participants whose carbon footprint decreased are highlighted in blue.*

elements of the experience which facilitated change, and was mentioned by almost all participants. The following themes in Table 6.4 from *push* to *bigger picture* describe how participants felt that Footpaths had enabled them to change, by giving them a push to do things they had been meaning to do, by helping them to feel not alone, etc. The *responsible* theme describes a characteristic of the participant; almost all participants felt that they had a responsibility to reduce their carbon footprint. The two themes *support* and *respect* described elements of the group which participants felt were important in the group and were only mentioned by participants whose carbon footprints decreased. The themes *socialising* and *fun* were elements of the group which participants felt were important to the group, and were mentioned only by participants whose carbon footprint increased. The final four themes described characteristics of the participants and were mentioned only be those whose footprint increased.

6.6 Discussion of participant level analysis

The integrated analysis of quantitative and qualitative data for the 13 participants for whom full data sets were available addressed three of the research questions proposed at the end of Chapter 2.

3. *Does the environment provided by group-based interventions facilitate model building, effectiveness and meaningful action?*
4. *Are increases in pro-environmental behaviour, and decreases in carbon footprint and energy use associated with increased understanding, effectiveness and potential for meaningful action?*
5. *What other elements of the environment provided by group-based interventions are associated with participants' willingness to engage in pro-environmental behaviours?*

Results from detailed analysis of these 13 participants suggest that there is a relationship between the reasons for joining stated in the interviews and changes in pro-environmental behaviour and carbon footprint. Participants who joined hoping for group support in making changes, for a chance to spend focused time and attention on the issues, or who wanted to do something with a community, had smaller carbon footprints a year after joining Footpaths. They also increased their pro-environmental behaviour

over the course of the year. Furthermore, all these participants had increased scores for at least one of the psychological measures,

Participants who joined primarily for social contact, or who did not state a clear reason for joining, did not have smaller carbon footprints a year after starting Footpaths, and those who joined primarily for social contact did not increase their pro-environmental behaviour over the year. The participants who were motivated by social contact also had decreased scores for all the psychological measures. The two participants who joined for no clear reason had increases for some of the psychological measures

The comparison of changes in psychological measures with changes in carbon footprint reveals that in every case where model building increases the size of carbon footprint decreases. This suggests that an increase in model building is a sufficient condition for a decrease in carbon footprint in this limited sample. As carbon footprint reduction was directly related to reductions in emissions calculated from measured energy use, this finding may indicate that an increase in model building is a sufficient condition for reductions in actual energy use. In all cases where there was an increase in model building there was also an increase in pro-environmental behaviour again suggesting that an increase in model building may be a sufficient condition for an increase in pro-environmental behaviour.

These findings may indicate that acquiring a clearer understanding of what a lower carbon life would be like, and of what changes make a difference to carbon footprint size, is closely related to reductions in carbon footprint size, to reductions in measured energy use, and to increases in pro-environmental behaviour. The importance of improved mental models is further supported by qualitative findings from the participant level analysis comparing those who reduced their carbon footprint and those who did not. Both reducers and non-reducers thought discussion was an important element of Footpaths, but more reducers than non-reducers mentioned the importance of breaking the subject into areas in order to gain a better understanding of what contributed to the size of their carbon footprint and what changes were effective and possible for them. On the other hand four of the five non-reducers felt they had a lot of relevant information before joining Footpaths, suggesting that they may not have been as open to expanding their mental models as those who were less certain of their

existing knowledge. Three of the five non-reducers also discussed the complexity and difficulty of change possibly reflecting less clear mental models

All of the participants who had increases in effectiveness also had an increase in pro-environmental behaviour suggesting that an increase in feelings of effectiveness is a sufficient condition for increased pro-environmental behaviour. Only one of the participants whose carbon footprint decreased in size had a decrease in effectiveness which may indicate a link between increased feelings of effectiveness and reductions in carbon footprint. As carbon footprint reduction was directly related to reductions in emissions calculated from measured energy use, this finding suggests that an increase in effectiveness is closely related to reductions in actual energy use. These results may indicate that decreases in feelings of overwhelm, helplessness and frustration are related to increases in pro-environmental behaviour, decreases in the size of carbon footprints, and a reduction in energy use.

A link between clear-headedness and reductions in carbon footprint is suggested by the comparison of those who reduced their carbon footprint with those who did not. Three of the reducers but only one of the non-reducers thought having time and space to focus on the issue was an important element of Footpaths. Three of the reducers also thought Footpaths helped them to prioritise, while only one of the non-reducers identified this as an important element in Footpaths. In contrast, having fun, which may be related to achieving clear-headedness, was only mentioned by non-reducers as an important element of Footpaths.

The participation aspect of meaningful action was important to all participants, but there was a split between the reducers, who identified group support and not being alone as important elements, and non-reducers who identified socialising as important. Respect was a theme mentioned only by reducers and lack of control was mentioned only by non-reducers. This is in line with research related to locus of control where previous studies have shown that people without an internal locus of control are less likely to engage in sustainable behaviours (Allen and Ferrand, 1999).

Chapter 7: Discussion and Conclusions

Previous chapters reported on the qualitative and quantitative studies undertaken to evaluate the effectiveness of the Footpaths programme in promoting significant and durable changes in pro-environmental behaviour. These studies sought to investigate whether Footpaths' participants made changes to their behaviour and whether these changes were durable. They also sought to identify elements within Footpaths which were related to changes in behaviour, and to examine the processes underlying those elements. Findings from these studies have been discussed both separately in Chapters 4 and 5, and in combination for thirteen participants in Chapter 6. This chapter attempts to further integrate findings from these two studies to develop a fuller understanding of how group-based interventions may facilitate significant and durable increases in pro-environmental behaviour. An overview of the results is presented, theoretical and methodological considerations are identified, limitations of the study and suggestions for further research are provided, followed by the implications for practitioners and policymakers.

7.1 Overview of results

Voluntary behaviour change has substantial potential for contributing to reductions in carbon emissions (Spence and Pidgeon, 2009) but reviews of recent interventions suggest that this potential is generally not being reached, and that when change occurs it is not durable (Abrahamse, Steg, Vlek, and Rothengatter, 2005). As group-based interventions are associated with significant and durable change it is possible that the processes identified within such interventions can be applied outside a group setting to increase pro-environmental behaviour and reduce carbon emissions. In the hopes of identifying such processes the overall aim of this study was to examine how group-based interventions might facilitate significant and durable increases in pro-environmental behaviour. The objectives to meet this aim are:

1. To evaluate the extent to which participants in group-based interventions increase their pro-environmental behaviour and reduce their energy use and carbon emissions
2. To assess the durability of any changes in behaviour and reductions in energy use and carbon emissions associated with group-based interventions

3. To explore what elements within the group-based interventions are associated with pro-environmental behaviour change
4. To develop an understanding of the processes underlying the elements in group-based interventions which are associated with pro-environmental behaviour change.

The results of the research for each of these objectives are discussed below, followed by a consideration of the wider implications of the research for the design of effective interventions targeting pro-environmental behaviour. The limitations of the study and ideas for further work are also presented.

7.1.1 Reliability and durability of changes in behaviour and reductions in emissions

The first two objectives of the research reported here relate to the reliability and durability of group-based interventions in increasing pro-environmental behaviour and decreasing carbon emissions. Evaluating behaviour change interventions which target multiple behaviours is challenging and the quantitative methodology adopted here used both an aggregate measure of behavioural frequency and size of carbon footprint in addition to emissions data from recorded energy use to attempt to assess the effectiveness of the programme.

The literature review indicated that group-based interventions targeting pro-environmental behaviour are very effective at promoting reductions in energy use and associated carbon emissions, with reductions in carbon emissions varying between 17% and 23% for the four interventions examined. The reductions for the Footpaths' participants for emissions calculated from recorded energy use were similar with reductions of 22% for emissions related to home energy use, 74% for emissions related to air travel, and an increase of 4% for emissions related to car travel. Estimated overall emissions reductions from the carbon footprint calculator were 20% over a year, with a 15% decrease over the course of the programme, which usually lasted about three months. There were also significant increases in the frequency of pro-environmental behaviour over the course of the programme, and those increases were maintained one year later.

These figures suggest that participants in Footpaths significantly increased their pro-environmental behaviour and reduced their energy use and carbon emissions. Results

from the evaluation of the Footpaths programme show similar reductions in energy use and carbon emissions to previously documented group-based interventions. Furthermore these changes were durable, with increases in pro-environmental behaviour and reductions in carbon footprint maintained or increased a year after the groups started. Where evidence was available for previously studied group-based interventions, a similar pattern was seen with increases in pro-environmental behaviour and reductions in energy use and carbon emissions maintained or increased over time.

In addition to revealing a reduction in energy use and carbon footprint size and an increase in pro-environmental behaviour, results suggest that Footpaths' participants made changes to both food and transport, the "harder to change behaviours" identified by DEFRA (2008). Some of these changes were reflected in significant reductions in carbon footprint size attributable to changes in food and transport.

Finally, there is a stronger relationship between pro-environmental behaviour and both worldview and attitude after participating in Footpaths, as well as a stronger relationship between worldview and carbon footprint size. This may indicate that not only does pro-environmental behaviour increase after taking part in Footpaths, but that behaviour aligns better with both worldview and attitude after participation. This suggests that participation in group-based interventions may help to close the gap between attitude and behaviour.

7.1.2 Elements in group-based interventions associated with behaviour change

The third objective is concerned with developing an understanding of the elements in group-based interventions associated with behaviour change. Previous researchers suggested that there were three elements which were important to the effectiveness of group-based interventions:

- a supportive social context
- the provision of information
- feedback on the effects of behaviour change on energy use and carbon emissions.

This study allowed the importance of these elements to be explored further. The results suggest that the first two elements are important to facilitating pro-environmental behaviour change, but that the third element, feedback, may be less important.

Supportive social context

The element of supportive social context identified in previous studies seems to have been important to participants in Footpaths, but an important distinction emerged between social contact and group support in facilitating pro-environmental behaviour change. Hargreaves *et al.* (2008) suggested that using existing social groups to promote carbon reduction might be an effective way of involving people not already concerned with the issue. This suggestion assumes that people who meet together for social reasons will adopt more pro-environmental behaviours if they meet in a group setting and discuss pro-environmental behaviour change. The findings from this study suggest that people who attend a carbon reduction group with the primary purpose of social contact do not reduce their carbon footprints. In contrast, those who attend a group with the purpose of seeking group support in changing their behaviour do reduce their carbon footprint.

A recent study of another group-based intervention targeting pro-environmental behaviour change, the Transition Together project, expected social contact to be the most important element in facilitating pro-environmental behaviour change (Beetham, 2011). Although social contact was important, the researchers were surprised to find that a large proportion of responses to open-ended questions on why the groups were helpful were concerned with knowledge building with an emphasis on information, learning, and practical know-how, elements related to building and extending mental models, and increasing competence. Unfortunately this emphasis from participants on factors related to exploration and increasing understanding was not quantified in the evaluation of the programme as the researcher had not expected this to be an important factor and had not included questions related to increasing knowledge in their questionnaires. A recent study by Thogersen (2009) supports the importance of cognition over social contact. He found that environmentally responsible behaviour is much more closely related to personal norms which are embedded in extensive cognitive structures than to subjective social norms. This suggests that developing their

own mental models of appropriate behaviour is more important to individuals in changing their pro-environmental behaviour than the social norms of the group.

The distinction between social contact and group support has important implications for studies on the importance of social interaction to changing pro-environmental behaviour. Group support or working with others is an important aspect of participation which appears to be linked to pro-environmental behaviour change in this study. Social contact on the other hand may be related simply to a human desire to enjoy the company of others. Staats *et al.*(2004) suggest that social interaction is important because of its effect on personal and social norms, but findings from this study suggest that social interaction may not be sufficient to lead to behaviour change for participants who are not focused on changing their behaviour. This finding reflects the conclusions of Bull *et al.* (2008) who suggest that it is not just any social interaction that leads to social learning, but that learning requires active participation in a structured and planned process. Several participants identified this effect during interviews; when asked if they would recommend Footpaths to a friend they were clear that it would need to be a particular kind of friend, one who was interested in finding out more or wanting to make changes.

Information

Discussion and the sharing of information were highlighted by previous researchers as central to how information was provided and understood by group participants. The importance of discussion seemed to have two elements: one was through diffusion of information, particularly local information (Nye and Burgess, 2008) and the other was related to actively engaging with the information to understand how it could be applied to individual circumstances. Wilson and Irvine (2012), in an evaluation of a variety of communication campaigns targeting pro-environmental behaviour, also conclude that the opportunity for discussion and exploration of issues with others contributed to increased behaviour change compared to interventions which provided information alone. The importance of the opportunity to discuss information is also highlighted by Hobson (2006) in a reflection on the experience of her earlier research (Hobson, 2003). She suggests that her interviews with participants in a longitudinal behaviour change programme ‘Action at Home’ were important to facilitating lifestyle changes as the

discussions during the interviews gave participants a chance to rethink their consumption practices. She concludes that talking about daily practices was important to changing them. Werner *et al.* (2008) demonstrate that discussion was more effective than lectures at influencing behaviour of high school students in their choice of non-toxic personal care products.

Discussion was also central to Footpaths as it allowed active engagement with information from a variety of sources, and encouraged participants to examine their behaviour to identify possible changes. Footpaths' participants were deeply concerned about information and emphasised the importance of reflecting on this information in a variety of ways. The opportunity to examine their own lives in detail, and then to spend focused time considering different aspects of their lives appears to have assisted many participants in building their understanding of what they could do, and helped motivate them to take action. Essential to this process was access to reliable information and both the Footpaths programme handbook and other participants were seen as sources of information which could be explored and interrogated. Trust in the information provided in the handbook and by other participants seems to have been increased by the opportunity to discuss and explore the information both in discussion sessions and in the exercises and games. The repeated engagement with the issues over the seven sessions helped to keep the issues in the minds of the participants for an extended period of time and this "keeping it in mind" seems to have been important to participants in making changes to their lives.

There has been criticism of the information deficit approach to behaviour change with evidence suggesting that increasing knowledge does not lead to changes in behaviour (Schultz, 2011) but as Frick *et al.* (2004) have pointed out, knowledge is necessary for successful action, particularly knowledge related to specific behaviours and to the effectiveness of different actions. Recent studies in sustainable consumption suggest that reliable and accessible information may be the most important element in changing behaviour. For example, Hanns and Bhom (2013), in a study looking at the effect of providing information on sustainable purchasing, found that participants who were provided with information about sustainable purchasing made larger changes to their purchasing choices than a comparison group and that this difference was statistically correlated with increased knowledge. The researchers failed to find an expected

correlation between increased self-efficacy, increased knowledge and more sustainable purchasing decisions, suggesting that the increased knowledge and increased consciousness of purchasing decisions was sufficient to lead to behaviour change without a change in self-efficacy. This intervention took place in several stages over eight weeks, providing a period of time over which participants remained engaged or were re-engaged with the issue of sustainable purchasing. This repeated engagement with the issues over time is also found in Footpaths and was valued by participants as it helped keep them focused on the issue of carbon reduction.

The importance of engagement with the issue over time is reflected in the behaviour of members of the comparison group (Hanss and Böhm, 2013) who also became more conscious of their purchasing choices, and increased their purchases of sustainable products. These participants were given no specific information on sustainable products but had simply completed questionnaires about their lifestyles and were regularly presented with the opportunity to buy sustainable products. Comparison group participants reported that the study made them think about their own lifestyles and that this reflection caused them to modify their behaviour to buy more sustainable products. The reflection on lifestyle mentioned by these comparison group participants highlights the importance of giving mental space to thinking about issues mentioned by Footpaths' participants. The staged nature of the intervention provided the opportunity to re-engage with the information which was also valued by many Footpaths' participants. A comparison group participant in the sustainable purchasing study stated that the study "made me think about my own lifestyle and my relationship to the resources on this planet" (Hanss and Böhm, 2013, p.65), a response very similar to those of a number of Footpaths' participants.

In the discussion of the importance of information in three of the previous studies of group-based interventions the availability of expert advice and/or tailored information was identified as important to reducing carbon footprints. Tailoring has been suggested as an effective way to encourage behavioural change with information on possible changes specifically tailored to the needs and characteristics of individuals through, for example, home energy audits (Abrahamse, Steg, Vlek, and Rothengatter, 2007). Tailored advice was provided in the Green Streets project and has been used in a number of other interventions (Abrahamse *et al.*, 2007; Bamberg, 2013). The findings

from this study, however, suggest that expert information and tailored advice may not be necessary for change to occur. Neither Carbon Reduction Action Group (CRAG) members nor Footpaths' participants had access to trained experts. Nevertheless the discussion within the groups seems to have facilitated exploration of the available information from handbooks, from websites, and from the experience of others, in a way that allowed participants to build a clear mental model of changes they could make which were appropriate for their circumstances. Through active engagement with information about a range of possible behaviours provided in the handbook, through games and exercises, and through interaction with other participants, individuals could choose and adopt behaviours and other changes which were appropriate for them. Participants also found that the modelling of behaviours by others encouraged them to attempt new behaviours. Discussing behaviours with those who were already implementing them appears to have helped both to make participants aware of possible behaviours and to make those behaviours seem possible for them.

Feedback

Previous researchers also identified feedback as an important component of group-based interventions. In the interventions reviewed above feedback included regular detailed information about savings in energy use, and in some cases waste and water reduction. Feedback was not a formal part of the Footpaths programme, however, and was not mentioned by participants as an important element in promoting change. Participants were encouraged to record their home energy use but this was not monitored by Footpaths, discussed with participants, raised at group sessions, or related back to previous energy use. Only half of the Footpaths' participants provided energy use data suggesting that only half monitored their energy use. Furthermore, there was no correlation between those who reduced their carbon footprint and those who provided information on emissions related to recorded energy use. Nonetheless Footpaths' participants showed similar reductions in home energy use to participants in programmes where feedback was a central part of the programme.

The lack of importance of feedback in the Footpaths programme is interesting in light of the increasing concerns about the durability of change related to feedback in other studies (Hargreaves, Nye, and Burgess, 2013; van Dam, Bakker, and van Hal, J. D. M.,

2010). Recent work by Hargreaves *et al.* (2013) on the long term effects of energy monitoring in households suggests that although the feedback provided by monitors helped households understand and be aware of their energy consumption, the continuing feedback provided by the meters did not motivate interviewees to make substantial changes to their behaviour. Another study by Van Dam *et al.*(2010) also suggests that energy reductions made as a result of feedback from energy monitors alone are not durable. They compared participants who chose to retain their monitors at the end of an intervention to those who did not and found that energy consumption increased at the same rate for both groups post-intervention. These findings suggest that although feedback may be useful in changing behaviour, it is not necessary, and more importantly, they also suggest that feedback alone is not sufficient to promote durable change.

The results from the Footpaths programme suggest that the elements of social interaction and provision of information are important to the effectiveness of group-based interventions and that feedback is not essential to behaviour change. Social interaction appears to have two facets, social contact and group support. The importance of social interaction seems to be related to group support, working with others towards a particular goal and not feeling alone, rather than to simple social contact. The importance of discussion and sharing of information to the effectiveness of group-based interventions is confirmed but the importance of tailored information is not. Instead of receiving tailored information, Footpaths' participants were able to actively engage with information provided in a variety of formats, to determine what was relevant to them and apply it to their own lives.

7.1.3 Processes underlying the elements associated with behaviour change and emission reductions

The fourth objective seeks to develop an understanding of the processes underlying the success of those elements within group-based interventions found to be associated with pro-environmental behaviour change. Provision of information, building knowledge and group support appear to be important elements in group-based interventions associated with changes in pro-environmental behaviour and reductions in emissions. The RPM provides a framework for considering why these elements appear to facilitate behaviour

change, with further insights being provided by the emergent themes from qualitative analysis of interviews with participants.

Bamberg (2013) has questioned the usefulness of the most commonly used theoretical frameworks in environmental psychology for developing interventions, pointing out that these theories are not very useful for spanning the gap between intention and behaviour. The RPM specifically addresses the issue of how to influence behaviour by proposing that there are elements in the environment which will facilitate reasonable behaviour. Kaplan and Kaplan (2009) suggest that an environment which provides an opportunity for model building, being effective and meaningful action will promote reasonable behaviour. The research reported here suggests that an environment that supports people in this way promotes increases in pro-environmental behaviour, and helps to better align pro-environmental behaviour with pro-environmental worldview and attitude.

Previous researchers have suggested that increases in competence and self-efficacy result from feedback and may be related to changes in behaviour although they did not measure either competence or self-efficacy (Hargreaves *et al.*, 2008; Staats *et al.*2004). Although analysis of results from the Footpaths programme demonstrates increases in both competence and self-efficacy these were not the measures most closely related to changes in behaviour in Footpaths' participants. Of the variables included in this study, model building and effectiveness were the most closely related to changes in behaviour and reductions in emissions. Items measuring these two constructs sought to quantify changes in participants' knowledge and comfort with knowledge, and their increases in competence and clear-headedness. De Young (1996) identifies competence motivation as important to adopting new behaviours and suggests that procedural knowledge enhances competence. Procedural knowledge is essential to adopting new behaviours because people want to be competent and may be resistant to adopting behaviours when they feel incompetent to perform them. The recorded changes reported here in the two constructs of model building and effectiveness and their relation to changes in carbon footprint and pro-environmental behaviour seem to support this suggestion. Furthermore there appears to be a clear link in this study between the provision of information, the opportunity to explore information, and increases in model building and effectiveness. Supportive social context is also an important element, but the

importance appears to be related more to participation and information sharing than to pure social contact.

Three processes seem to have been associated with building and extending mental models: bringing attention to the issue and keeping attention on the issue over a period of time; looking at parts of the issue in detail and then relating the parts to each other; and exploring the issues with other people. Model building was supported by the multiple meetings which helped to keep the issue in the front, or the back, of participants' minds over a period of time and which appeared to help participants to engage with new information. The process of breaking their lives up into separate parts, giving some time to considering each part, and seeing how the parts fit together also appears to have been important in facilitating change.

Feelings of effectiveness appear to have increased as a result of learning procedural information from others and from the handbook and from teasing out the issues with others. All these appear to have assisted participants in developing a better understanding of how to make changes. Talking about doing things with others in the group appeared to motivate participants by making proposed changes more concrete. Overall, it seems that examination of their own lives coupled with active engagement with information over a period of time built participants' understanding and confidence in their ability to make changes, and that procedural information and modelling by others made participants feel more competent to change their behaviour.

Being involved with a group of people all working on the issue also seems to have been important in helping participants to feel that they were not the only people engaged with the issues. Not feeling alone in caring about the environmental impact of their lives, and not being the only one trying to make a difference appears to have increased participants' motivation to make changes.

There is some indication from other studies that the processes related to model building identified here may underlie the effectiveness of some non-group-based interventions in promoting pro-environmental behaviour change. Three other recently published studies suggest that the chance to look at one's own pro-environmental behaviour, followed by reminders which keep the issue in people's consciousness, may make a difference to the frequency of pro-environmental behaviour. Hanns and Bhom (2013) found that

participants in the comparison group of a study about sustainable groceries become more conscious of their purchasing choices, and increased their purchases of sustainable products even though these participants were not provided with any information on the benefits of buying sustainable products. They suggest that this may be the result of comparison group participants being given an opportunity to reflect on their own lifestyle by completing a questionnaire and then being offered the opportunity to choose sustainable products weekly over eight weeks. Having an opportunity to examine current behaviour followed by repeatedly having their attention drawn to the issue of buying sustainable products appears to have influenced these participants' behaviour.

Another recent study by Bamberg (2013), exploring the effectiveness of a tailored communication campaign in changing transport behaviour, may also suggest the importance of both focusing attention on an issue and then repeatedly drawing attention to that issue. Participants were contacted and asked to complete a survey on mobility behaviour. They were then contacted by telephone, asked to keep a detailed mobility diary for three days, and presented with a set of written information about travel behaviour. They were contacted again two weeks later and discussed their transport behaviour further. In common with the study by Hanns and Bohm (2013) participants completed a questionnaire which invited them to reflect on their own lifestyles, and then received a number of interventions over time. Participants were given an opportunity to examine their travel behaviour in detail and then re-engaged with the issue of travel over a period of time. It seems possible that part of the success of this intervention in changing behaviour may be related to the opportunity it provided to participants to look at their behaviour in detail, followed by a number of interventions which helped them to keep the issue in mind.

A third study looking at the results of the Energy Demand Research Project in the UK compared the results of various interventions in a large scale consumer study run by a number of energy supply companies (AECOM, 2011). Each company designed their own intervention variations which allows for some interesting comparisons of the effect of information provision. After installing smart meters and providing initial instructions and advice one energy company supplied simple energy efficiency advice at intervals over the course of a year. Another energy company provided more comprehensive advice but only once at the start of the trial at the same time as the installation of a smart

meter. There was higher customer engagement with the more detailed advice, but greater reductions in energy use were seen in the intervention which provided simpler information regularly over the course of a year. Again it seems that an initial intervention followed by a process which keeps the issue in participants' minds may lead to changes in behaviour.

7.1.4 Summary

Findings from this study suggest that interventions which support people in building and extending mental models, and which help to increase their feelings of effectiveness, are likely to be effective in promoting significant and durable changes in pro-environmental behaviour. Footpaths' participants reduced their carbon footprints by 15 percent over the course of the programme, and increased the reductions to 20 percent over a year. Group-based interventions appear to provide supportive informational environments where participants can examine, modify, and extend their mental models of how to live lower-carbon lives. This model building seems to be supported by focusing attention on the issues over a period of time, as well as active engagement with information, and exploring the issues with other people. Increases in model building are related to both increases in pro-environmental behaviour and decreases in carbon footprint size. Group-based interventions also support feelings of effectiveness through working with others and provision of procedural information, and increases in feelings of effectiveness are related to increases in pro-environmental behaviour and reductions in carbon footprint size. These supportive informational environments may allow people to overcome perceived barriers to pro-environmental behaviour and hence lead to a closer association between pro-environmental behaviour and both worldview and attitude.

7.2 Theoretical considerations

This is one of the few studies to utilise the Reasonable Person Model (RPM) in relation to pro-environmental behaviour. The RPM provides a synthetic theory which encompasses most of the elements found to be important to facilitating pro-environmental behaviour change in Footpaths' participants. Results from this study suggest an association between increases in measures associated with the RPM and both increases in pro-environmental behaviour and reductions in carbon footprint. This

relationship provides empirical insight into the importance of environments which support human informational needs in promoting reasonable behaviour in the area of pro-environmental behaviour.

7.2.1 Attitude-behaviour gap

Results from this study suggest that pro-environmental behaviour may align better with worldview and attitude after participation in Footpaths. This suggests that information provided in a way which is supportive of human informational needs may be useful in addressing the attitude-behaviour gap, perhaps by making pro-environmental behaviour seem more possible. Closing this gap is important to promoting pro-environmental behaviour change among those with pro-environmental world-views and attitudes.

7.2.2 Self-efficacy and feedback

It has been suggested previously that self-efficacy is increased as a result of feedback, and that this increase in self-efficacy is related to increases in pro-environmental behaviour. Formal feedback did not form part of the Footpaths programme, and in the group observed there was no emphasis on feedback. Nevertheless Footpaths' participants made significant and durable reductions to their carbon footprints, improved their mental models, and increased their feelings of effectiveness and self-efficacy. This suggests that feedback, identified by previous researchers as integral to the success of these group-based interventions, is not essential for behaviour change. It also suggests that increases in self-efficacy are not necessarily reliant on feedback.

7.2.3 Mindfulness

Previously mindfulness has been positively linked to frequency of pro-environmental behaviour. Findings from this study showed no link between mindfulness and pro-environmental behaviour, and no link between changes in mindfulness and changes in pro-environmental behaviour. Although Footpaths appears to have supported participants in directing attention to pro-environmental behaviour this was not reflected in the mindfulness measure, perhaps suggesting that mindfulness is not directly related to directed attention.

7.2.4 Social context

Finally, this study suggests that there were two components to social context: social contact and group support, and it appears that social contact was not associated with pro-environmental behaviour change. This distinction may be related to extrinsic and intrinsic motivation, where a desire for social contact or socialising is an extrinsic motivation and where group support is important in allowing people to realise goals towards which they are intrinsically motivated. This has implications for the use of existing social groups in the design of interventions as a desire to meet with others may not lead to increases in pro-environmental behaviour without a prior desire to change behaviour.

7.3 Methodological considerations

The RPM has not previously been operationalised in the area of pro-environmental behaviour change. This study has provided an initial set of statements that could be used or adapted to explore the relationship between pro-environmental behaviour and a supportive informational environment. The possibility that mindfulness might relate to model building was not supported by this study, and it does not appear that mindfulness is a useful measure of model building. The lack of significant change in mindfulness supports suggestions that mindfulness as measured by the Mindfulness Attention Awareness Scale is a dispositional attribute and not a state. Measures of self-efficacy and competence were moderately related to each other, but were not as closely related to effectiveness as expected and further consideration should be given to the relationship between these constructs and the RPM.

Measures of meaningful action developed for this study reflected the locus of control element of meaningful action but failed to reflect the "meaningfulness" element. This was reflected in the qualitative study, however, through the "wanting to make a difference" theme. Questions based on wanting to make a difference might better reflect the meaningful action facet of the RPM.

Osbaldiston and Schott (2012) suggest that carbon footprint analysis may be a useful method for comparing the environmental impact of different behaviours and that it may provide a better measure of the actual environmental impact of changes in behaviour than self-report measures of behavioural frequency. In this study some concrete

validation of the usefulness of carbon footprint estimates as a proxy for changes in pro-environmental behaviour were provided by data on carbon emissions calculated from measured energy use as changes in carbon footprint were significantly correlated with changes in emissions calculated from measured energy use.

7.4 Limitations of the study

The conclusions in this study are based on a limited number of self-selecting participants from a particular area in the UK. These participants had higher than average pro-environmental worldviews and attitudes and had an existing interest in environmental issues. Furthermore there was some attrition over the course of the study and it is possible that those who were more interested in reducing their carbon footprint may have been more willing to provide information at the end of the group sessions and a year later. However, a comparison of median carbon footprint size for participants who remained in the study indicates that the initial carbon footprint for this group was slightly higher than that for all participants. The limited number of participants also restricted the use of more sophisticated statistical techniques, which might have provided more insight into relationships within the data.

The study lacked comparable data for the same time period for the UK population to allow a comparison of Footpaths' participants with those not involved in the programme. It seems unlikely that reductions in energy use of the size seen in Footpaths' participants is a general phenomenon however, as carbon emissions related to domestic energy use rose from 2009 to 2010, the periods covered by the energy use data in this study (Department of Energy and Climate Change, 2013a) . Furthermore, statistical analysis suggests that the correlations between the changes in outcome variables and measures related to the RPM are not likely to have occurred by chance.

There were some difficulties in operationalising the RPM. Measures used to assess meaningful action were not as informative as would have been desirable, and it would be useful to devise measures that more closely reflected participants' experiences of meaningful action, as described in interviews. Mindfulness was not a useful measure of model building and self-efficacy and competence were not correlated as well with the effectiveness factor as expected, although there was some relationship.

Finally, although the changes in pro-environmental behaviour documented in this study were durable over the course of one year, the longer-term effect of this intervention on behaviour has not been documented.

7.5 Further research

It would be useful to extend this study using a larger data set to validate the findings. Quantitative data are still being collected from on-going groups and there are plans to extend the analysis to include those data. A second data set will allow the findings from this study to be contrasted with a separate set of data, and a combination of the data from all groups will provide a sufficient number of cases to allow the use of more sophisticated statistical techniques.

One of the problems with the group-based interventions described here is the commitment of time required to attend multiple sessions. It would therefore be useful to devise different types of interventions incorporating the processes identified here as underlying the effectiveness of group-based interventions, and to evaluate those interventions to determine whether these processes are helpful in other contexts.

7.6 Implications for practitioners

The findings from this study have a number of implications for the design of interventions promoting increases in pro-environmental behaviour and reductions in individual carbon footprints. The Footpaths programme is very effective at promoting pro-environmental behaviour leading to significant and durable reductions in carbon footprint size and recorded energy use, as well as increases in pro-environmental behaviour. These decreases in carbon footprint size and increases in pro-environmental behaviour are linked to opportunities to build and expand mental models provided by a number of elements within Footpaths. These include the presentation of a variety of information in a number of different formats over an extended period of time and the opportunity to discuss the issues with other people. The variety of information allows each participant to develop a mental model which is appropriate for that individual. The repeated exposure to a variety of information allows models to be developed gradually, and discussion provides both an opportunity to learn from others and to expose an individual's existing behaviour and mental models to scrutiny.

The relationship between those who joined Footpaths primarily for social contact and the failure of those participants to reduce their carbon footprints also has important implications for the design of interventions, suggesting that interventions should perhaps be focused on individuals with an interest in change rather than assuming that social norms will influence the behaviour of those without an interest in changing their behaviour. It might be possible to screen potential participants to identify those who are primarily interested in socialising and to exclude those participants where spaces or resources are limited.

7.6.1 Group-based interventions

Implementing Footpaths or similar group-based interventions more widely appears to have potential for significantly reducing carbon emissions for individuals who are already interested in increasing their pro-environmental behaviour and in reducing the size of their carbon footprints. Such interventions are being developed by a number of Transition Towns (Beetham, 2011) and Global Action Plan is still delivering its EcoTeams programme (Global Action Plan, 2013). The findings from this study suggest that in developing such interventions practitioners should be aware of the importance of environments which support human information processing to maximise the effectiveness of the intervention. In particular the importance of discussion with others in the groups to building and expanding mental models suggests that the role of experts might be to create an environment in which such discussion can take place, rather than in leading such discussions. Programmes may be more effective where practitioners acknowledge that people are experts in their own lives, and that individuals are able to choose the most appropriate way to reduce their own carbon footprint from a variety of actions. Part of the development of mental models of lower carbon lifestyles includes social support from others who are also interesting in reducing their carbon footprint. Discussion allows individuals to observe others like them who are either modelling behaviours or discussing behaviours which had not previously occurred to the individual or which had not seemed possible for someone like them.

7.6.2 Other intervention types

The time commitment involved in attending multiple sessions of a group-based intervention and the group-based format itself may prevent such a programme from

being universally applicable. The barriers to attending a group such as this were apparent in the concern expressed by some Footpaths participants that they might not fit into the group, or that they might not be respected. Given that these group-based interventions may only appeal to a particular set of people, it would be helpful to identify which elements and processes related to the effectiveness of group-based interventions are applicable in some way to other intervention types. The results from the evaluation of group-based interventions and the indications from other studies suggest that there are a number of processes which may be important in promoting pro-environmental behaviour change.

The first is focusing attention on current behaviour, and the second is keeping attention focused on the issue or returning attention to the issue over a period of time. These allow people to develop an accurate mental model of their current behaviour, and allow time for that model to be extended to include new or modified pro-environmental behaviour. This fits with the suggestion by Nye and Burgess (2008) that EcoTeams was successful because it helped to move behaviour from practical to discursive consciousness, and with Staats *et al.'s* (2004) attribution of changes in behaviour in the Dutch EcoTeams to more "reasoned" behaviour. Therefore in designing interventions it may be helpful to include opportunities for examination of current behaviour followed by repeated opportunities to re-engage with relevant information.

Another important process which might be useful to include in interventions is active engagement with information to aid in knowledge building. Footpaths provided this active engagement through discussion sessions, exercises, and games. This element of active engagement with information could be provided in non-group settings through the use of online forums, games, and other web-based applications. The use of web-based resources might also help to address the final process, working with others. With the continuing expansion of social media there are already opportunities for people to network with others who have an interest in reducing their personal carbon emissions, for example the 10:10 project (10:10, 2013). The potential of social media to provide a platform for feedback and discussion has been explored in a recent project using Facebook, achieving significant reductions in household energy use (Foster and Lawson, 2013). Findings reported here might be used to inform the development of

such web-based resources to make them more effective in promoting pro-environmental behaviour.

7.7 Implications for policymakers

There appears to be a shift in emphasis in the United Kingdom from promoting voluntary pro-environmental behaviour change towards technological and economic strategies to reduce carbon emissions (HM Government, n.d.). Although technological and economic strategies are likely to be important, results from this study suggest that there are large potential reductions in carbon emissions that could be realised over the short term for at least some portion of the UK population. It is therefore important that effective voluntary behaviour change programmes are encouraged and promoted which could include active support for group-based interventions. Backing programmes such as Footpaths has the potential to shift the behaviour of the more pro-environmental segment of the population, and this might contribute to an overall culture change. The potential of this type of behaviour change programme has been recognised in a recent publication by the European Environment Agency (European Environment Agency, 2013) which emphasises the necessity of having a plurality of approaches to reducing carbon emissions.

This study also indicates that there are substantial reductions in carbon emissions which could be realised by individual behaviour change in areas other than household energy use, which is the current focus of UK government policy on carbon reduction from the domestic sector (HM Government, 2011; HM Government, n.d.). Footpaths' participants significantly reduced their carbon emissions from both food and transport, which are considered to be harder to change behaviours (DEFRA, 2008).

Finally, this study suggests that communication campaigns need to be designed with human informational needs in mind. The evidence of this and other studies suggests that presenting information in a way that helps people to reflect on their current behaviour and to re-engage repeatedly with the information may help them build better mental models of pro-environmental behaviour and increase their willingness to perform such behaviours. The group-based format of the Footpaths programme appears to be effective in supporting individuals in this way. This finding is relevant to the UK government's recent recognition of the potential of community groups to support the

roll-out of smart meters (Department of Energy and Climate Change, 2013b). Incorporating these elements of reflection on current behaviour and re-engagement with the information into programmes involving community groups may assist in realising the carbon-reduction potential theoretically associated with the installation of smart metering.

7.8 Conclusions

This study suggests that individual behaviour change can play a significant role in reducing carbon emissions in the UK, and that group-based interventions are very effective at promoting this behaviour change. Participants in the Footpaths programme reduced their carbon footprints by 15 percent over the course of the programme and continued to reduce their carbon footprint size after the programme finished resulting in a 20 percent reduction over the course of a year. This reduction was confirmed by reductions in emissions calculated from measured energy use. Furthermore Footpaths' participants achieved these reductions without any formal feedback on their carbon emissions over the course of the programme.

Substantial reductions in carbon footprint size for Footpaths' participants came not just from reductions in household energy use but also from the harder to change behaviours such as food and transport. The Footpaths programme covered a number of lifestyle elements and participants were presented with an opportunity to actively engage with information about a wide range of behaviours. This approach accepts that people are experts in their own lives and indicates that, if given an opportunity to focus on pro-environmental behaviour and carbon reduction over a period of time, they will adopt new behaviours which are suitable for their circumstances. This approach seems to have helped participants close the gap between pro-environmental attitude and behaviour.

The informational environment provided by Footpaths appears to have helped individuals to see how their current behaviour affected their carbon footprints, and to see how their actions could make a difference. The opportunity to look at existing behaviour, and then to actively engage with information about possible changes over a period of time, seems to have helped participants develop clearer mental models of lower-carbon lifestyles. Provision of procedural information and the opportunity to discuss issue with others appears to have supported increased feelings of effectiveness.

Finally, working with others helped participants to remain engaged with the issues, and to believe that their actions were meaningful. These all indicate that an environment which supports human informational needs may support increased pro-environmental behaviour, and suggest that human informational needs should be considered in the design of interventions targeting pro-environmental behaviour.

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Appendices

Appendix 1 Agreement with Footpaths Organisers

Evaluation Study of Transition Leicester Carbon Reduction Project

Terms of Reference

IESD staff involved: Jill Fisher, supervisors: Dr Katherine Irvine, Dr Greig Mill, and Dr Andrew Reeves

Aim of Study

The aim of the study is to investigate how effective Transition Leicester Carbon Reduction Groups are in promoting reductions in household energy use/carbon emissions and to identify how participants feel about the groups.

Methodology

The study will consist of a questionnaire to be filled out before the first group session, a questionnaire to be filled out after the final session, and a questionnaire to be filled out a year after the sessions finish. In addition group members will be asked to participate in an interview about their experience after the sessions finish. Analysis will also require access to carbon footprint and energy use information collected as part of the sessions.

Outputs

The data from this study will be analysed and used in a PhD thesis, academic papers and conference presentations, and in a summary report for the Transition Leicester Carbon Reduction Project. Participants' names and other personal identifying information will not appear in the final thesis or any reports, papers or conference presentations resulting from this study.

Data Handling

All data collected and processed in this survey will be handled in compliance with the Data Protection Act 1998. All information will be anonymised and stored in a secure location.

Paper copies of the questionnaires will be numbered and cross-referenced to a separate database of names and addresses.

Interviews will be recorded when possible and then fully transcribed. The recordings will be stored in a secure location and only the researcher and her two supervisors will have access. All recordings and transcriptions will be coded and cross-referenced to a separate database of names and addresses.

Sharing Data with the Transition Leicester Carbon Reduction Project

The data is being collected as part of a PhD project at De Montfort University and therefore the data is owned by De Montfort University. However, anonymised data will be made available to the Transition Leicester Carbon Reduction Project to assist their evaluation of the project on the understanding that the data will be handled in compliance with the Data Protection Act 1998. The Transition Leicester Carbon Reduction Project will need to provide a written undertaking to the researcher agreeing to hold the data securely and process it fairly in compliance with the Data Protection Act 1998 before any data will be released to the Transition Leicester Carbon Reduction Project.

If you have any questions regarding this study or would like any additional information please do not hesitate to contact the researcher or her supervisors (see below).

Jill Fisher Tel: 0116 255 2551 x 6848: email: j.fisher@dmu.ac.uk

Dr Katherine Irvine Tel: 0116 207 8711 email: kirvine@dmu.ac.uk

Dr Greig Mill Tel: 0116 257 7965 email: gmill@dmu.ac.uk

Dr Andrew Reeves Tel: 0116 2689718 email: areeves@ruralcc.org.uk

If you have any queries specifically about Data Protection Issues you can contact Fraser Marshall, Records Manager, Kimberlin Library, De Montfort University, The Gateway, Leicester LE1 9BH, Tel: 0116 257 7655, email fmarshall@dmu.ac.uk.

Evaluation Study of Transition Leicester Carbon Reduction Project

Terms of Reference

I have read and accept these terms of reference

IESD Researcher:

On behalf of Transition Leicester Carbon Reduction Project:

Date:

Appendix 2 Participant Consent form

Dear Sir or Madam,

I am hoping that you will be willing to participate in a study about the Transition Leicester Footpaths groups. If you are happy to be involved please would you sign the consent form on the back of this letter. There are two copies of this letter and form so that you can keep one for your records. Please would you return one signed copy of the form to me with the initial questionnaire and your quick carbon footprint form in the prepaid envelope provided.

What is the purpose of the Study? The study seeks to understand how the Footpaths groups work and how people feel about participating in the groups.

What does the study involve? The study will consist of a questionnaire for you to complete before the first group session, a questionnaire for you to complete after the final session, and a questionnaire for you to complete a year after the sessions begin. I would also like to use the carbon footprint and energy use information you provide.

Who is carrying out the study? The study is being carried out by Jill Fisher from the Institute of Energy and Sustainable Development (IESD) at De Montfort University as part of a PhD and is being supervised by Dr Katherine Irvine and Dr Andrew Reeves from the Institute. The research is funded by the IESD and is supported by the Transition Leicester Footpaths Project.

How will the results be used? The data from this study will be analysed and used in a PhD thesis, academic papers and conference presentations, and in a summary report for the Transition Leicester Footpaths project. Neither your name nor any other personal identifying information will appear in the final thesis or any reports, papers or conference presentations resulting from this study. Anonymous data will be made available to the Transition Leicester Footpaths project to assist them in assessing and improving the project.

What will happen to information you provide? All data collected and processed in this study will be handled in compliance with the Data Protection Act 1998. All information will be anonymised and stored in a secure location.

Participation in this study is entirely voluntary. You may decide not to answer any of the questions if you wish. You may also decide to withdraw from this study at any time. I may ask for clarification of some points, but you are not obliged to clarify or participate further. Beyond that I will not seek any more information or make any further contact with you after the study finishes unless you ask me to.

I can assure you that this study has been reviewed and approved by my supervisors and the De Montfort University Human Research Ethics committee. If you have any questions regarding this study or would like any additional information please do not hesitate to contact me or my supervisors (see below).

If you have any queries specifically about Data Protection Issues you may contact Fraser Marshall, Records Manager, Kimberlin Library, De Montfort University, The Gateway, Leicester LE1 9BH, UK Tel: 0116 257 7655, email: fmarshall@dmu.ac.uk.

Thank you for your assistance in this study.

Yours Sincerely,

Jill Fisher

Jill Fisher	Tel: 0116 255 2551 x 6848:	email: j.fisher@dmu.ac.uk
Dr Katherine Irvine	Tel: 0116 207 8711	email: kirvine@dmu.ac.uk
Dr Andrew Reeves Tel:	0116 2689718	email: areeves@ruralcc.org.uk

Evaluation Study of Transition Leicester Carbon Reduction Project

Agreement to Participate

I have read the information presented in the letter about research being conducted by Jill Fisher for her PhD thesis at De Montfort University.

I have had the opportunity to ask any questions related to this study, and where applicable I have received satisfactory answers to my questions, and any additional details I wanted.

I am also aware that information which I provide may be included in the final thesis resulting from this research, in academic publications and presentations, and in a summary report for the Transition Leicester Carbon Reduction Project.

With full knowledge of all foregoing, I agree to participate in this study.

Participant Name: _____

Participant Signature: _____

Date: _____

Address (optional):

_____

_____

_____

Phone number (optional):

_____

Appendix 3 Questionnaires

Transition Leicester Footpaths Groups

Initial Questionnaire

Dear Sir or Madam,

My name is Jill Fisher and I am currently working on a project studying the Transition Leicester Footpath groups. This project is part of my PhD research at De Montfort University and it will help Transition Leicester to reflect on and improve the Footpath programme. Your help and assistance in completing the following questionnaire is an important part of this study.

The questionnaire should take 10 to 15 minutes to complete. I am interested in what you think - there are no right or wrong answers. You do not have to answer all of the questions if you prefer not to, but it would be very helpful if you could answer as many as possible. Some questions may seem similar. This is intentional and part of the research approach. All your answers will be kept confidential.

The letter included with this questionnaire explains more about my research. On the back of the letter there is a consent form. If you are willing to be part of the study please would you sign one copy of the form. Please return the signed form, the questionnaire and the quick carbon footprint form in the enclosed pre-paid envelope as soon as possible. I will need a signed copy of the consent form before I can use any information from your questionnaire.

Any information you provide will be handled in compliance with the Data Protection Act 1998. All information will be kept confidential and held securely at De Montfort University.

Thank you for your help.

If you have any questions at all please contact me by phone, email or letter.

Yours faithfully,

Jill Fisher

Jill Fisher

Institute of Energy and Sustainable Development
De Montfort University
Queens Building Room 1.05
The Gateway
Leicester LE1 9BH

Enquiries to: j.fisher@dmu.ac.uk

0116 255 2551 x 6848

Instructions: *Please read each question in bold and note the instructions given in italics. For some questions you will need to write in a number, for others you will need to circle a number or tick a box.*

Please indicate how <u>important</u> you think the role of the following is in tackling climate change

*Please circle **one number** for each*	**Not at all important**	**A little important**	**Somewhat important**	**Quite important**	**Very important**
Government	1	2	3	4	5
Business and Industry	1	2	3	4	5
Communities	1	2	3	4	5
Individuals	1	2	3	4	5

Please indicate your <u>main reason</u> for joining a Footpaths group
*Please **circle the letter** next to **one** of the following*

Reduce your carbon footprint
Learn more about climate change
Save money
Meet new people
Be involved in something in your community / neighbourhood
Other

Please indicate how <u>frequently</u> you do the following
*Please **circle one number** for each item*

	Never	**Infrequently**	**Sometimes**	**Frequently**	**Always**
Boil the kettle with only as much water as you need	1	2	3	4	5
Wash clothes at 40 degrees or less	1	2	3	4	5
Leave the lights on when you are not in the room	1	2	3	4	5
Leave the heating on when you go out for a few hours	1	2	3	4	5
Leave your TV or PC on standby for long periods of time	1	2	3	4	5
Put on warmer clothes indoors instead of turning up the heating	1	2	3	4	5
Wash a load of laundry only when you have a full load	1	2	3	4	5
Take a shower rather than a bath	1	2	3	4	5
Recycle items instead of throwing them away	1	2	3	4	5
Walk or cycle instead of driving for short journeys	1	2	3	4	5
Compost your household's food and/or garden waste	1	2	3	4	5
Reuse items like empty bottles, tubs, jars, envelopes or paper	1	2	3	4	5
Buy fresh locally grown food	1	2	3	4	5
Take public transport instead of driving	1	2	3	4	5

When thinking about <u>taking action</u> to reduce your carbon footprint please indicate how much you <u>agree</u> with the following statements

*Please **circle one number** for each statement*

	Strongly Disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
I am not sure what changes it would be possible for me to make to reduce my carbon footprint	1	2	3	4	5
I believe I have a responsibility to reduce my carbon footprint	1	2	3	4	5
I feel overwhelmed when I think about changing the way I live	1	2	3	4	5
I can imagine what my life would be like if I reduced my carbon footprint	1	2	3	4	5
Trying to take action to reduce my carbon footprint is frustrating	1	2	3	4	5
I have a clear idea about what actions to take	1	2	3	4	5
I feel helpless when I think about reducing my carbon footprint	1	2	3	4	5
My actions can make a difference to climate change	1	2	3	4	5
It is difficult to understand how to apply information about reducing my carbon footprint to my daily life	1	2	3	4	5

When thinking about <u>taking action</u> to reduce your carbon footprint please indicate how <u>confident</u> you are that you could do each of the things listed below

*Rate your degree of confidence by **circling one number** for each statement using the scale given below*

0	1	2	3	4	5	6	7	8	9	10
Cannot do at all				**Moderately certain can do**					**Highly certain can do**	

Limit your use of electricity	0	1	2	3	4	5	6	7	8	9	10
Use low carbon methods of travel	0	1	2	3	4	5	6	7	8	9	10
Limit the amount you personally throw away	0	1	2	3	4	5	6	7	8	9	10
Reduce the amount of rubbish you produce	0	1	2	3	4	5	6	7	8	9	10
Limit your use of gas	0	1	2	3	4	5	6	7	8	9	10
Restrict the number of non-food items you buy	0	1	2	3	4	5	6	7	8	9	10
Limit the amount of water you personally use	0	1	2	3	4	5	6	7	8	9	10
Choose a diet which is environmentally friendly	0	1	2	3	4	5	6	7	8	9	10
Involve others in engaging with carbon reduction	0	1	2	3	4	5	6	7	8	9	10
Help groups to work well together	0	1	2	3	4	5	6	7	8	9	10

Please select the <u>three actions</u> you think would <u>make the biggest difference</u> to the carbon footprint of the average household in the UK

*Please **circle the letter** next to each of the **three** categories you think would make the biggest difference*

Adopt a vegetarian diet

Install insulation

Install renewable energy

Limit water use

Reduce short haul flights

Use car less

Waste less food

Please indicate how <u>difficult</u> you think it would be to do the following things over the next 6 months

*Please **circle one number** for each action*	**Very difficult**	**Quite difficult**	**Not very difficult**	**Quite easy**	**Very easy**	**Already doing this**
Use less gas and electricity	1	2	3	4	5	6
Replace appliances with energy efficient alternatives	1	2	3	4	5	6
Replace light bulbs with energy efficient ones	1	2	3	4	5	6
Sign up to a green energy tariff	1	2	3	4	5	6
Turn the heat on less often and/or at a lower temperature	1	2	3	4	5	6
Install insulation	1	2	3	4	5	6
Turn off lights when leaving a room	1	2	3	4	5	6
Turn off/unplug electric goods that are not in use	1	2	3	4	5	6
Drive less	1	2	3	4	5	6
Cycle more	1	2	3	4	5	6
Use more public transport	1	2	3	4	5	6
Avoid travelling by plane	1	2	3	4	5	6
Make weekend trips and holidays closer to home	1	2	3	4	5	6
Eat less meat	1	2	3	4	5	6
Eat more organic products	1	2	3	4	5	6
Eat more locally produced food	1	2	3	4	5	6
Eat more seasonal produce	1	2	3	4	5	6
Produce less waste	1	2	3	4	5	6
Use less water	1	2	3	4	5	6
Buy fewer non-food items	1	2	3	4	5	6

For each of the statements listed below, please think about <u>how frequently</u> you have each experience in your everyday life

*Please **circle one number** for each item to indicate how **frequently** you have each experience*	**Almost Never**	**Very Infrequently**	**Infrequently**	**Frequently**	**Very Frequently**	**Almost Always**
I could be experiencing some emotion and not be conscious of it until some time later	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else	1	2	3	4	5	6
I find it difficult to stay focused on what is happening in the present	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time	1	2	3	4	5	6
It seems I am "running on automatic" without much awareness of what I'm doing	1	2	3	4	5	6
I rush through activities without being really attentive to them	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time	1	2	3	4	5	6
I drive places on "automatic pilot" and then wonder why I went there	1	2	3	4	5	6
I find myself preoccupied with the future or the past	1	2	3	4	5	6
I find myself doing things without paying attention	1	2	3	4	5	6
I snack without being aware that I'm eating	1	2	3	4	5	6

How much <u>responsibility</u> do you think the following should take for tackling climate change

*Please circle **one number** for each*	**None**	**A little**	**Some**	**A lot**	**All**
Government	1	2	3	4	5
Business and Industry	1	2	3	4	5
Communities	1	2	3	4	5
Individuals	1	2	3	4	5

Please indicate how much you <u>agree</u> with the following statements

*Please **circle one number** for each statement*

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
We are approaching the limit of the number of people the earth can support	1	2	3	4	5
Humans have the right to modify the natural environment to suit their needs	1	2	3	4	5
When humans interfere with nature it often produces disastrous consequences	1	2	3	4	5
Human ingenuity will insure that we do NOT make the earth unliveable	1	2	3	4	5
Humans are severely abusing the environment	1	2	3	4	5
The earth has plenty of natural resources if we just learn how to develop them	1	2	3	4	5
Plants and animals have as much right as humans to exist	1	2	3	4	5
The balance of nature is strong enough to cope with the impacts of modern industrial nations	1	2	3	4	5
Despite our special abilities humans are still subject to the laws of nature	1	2	3	4	5
The so called “ecological crisis” facing humankind has been greatly exaggerated	1	2	3	4	5
The earth is like a spaceship with very limited room and resources	1	2	3	4	5
Humans were meant to rule over the rest of nature	1	2	3	4	5
The balance of nature is very delicate and easily upset	1	2	3	4	5
Humans will eventually learn enough about how nature works to be able to control it	1	2	3	4	5
If things continue on their present course, we will soon experience a major ecological catastrophe	1	2	3	4	5

Here are some typical statements about climate change and the impact of our daily lives on the environment. Please indicate which one is <u>closest to how you think and feel</u>

*Please **circle the letter** next to **one** of the statements below*

a I don’t know much about climate change. I can’t afford a car so I use public transport.

b ‘Waste not, want not’ that’s important. You should live life thinking about what you’re doing and using

c I think I do more than a lot of people. Still, going away is important, I’d find that hard to give up.

d Maybe there’ll be an environmental disaster, maybe not. Makes no difference to me, I’m just living my life the way I want to.

e I do a couple of things to help the environment. I’d really like to do more as long as others were.

f I think it’s important that I do as much as I can to limit my impact on the environment.

g I think climate change is a big problem for us. I suppose I don’t think much about how much water or electricity I use, and I forget to turn things off… I’d like to do a bit more.

12. Finally, please could you tell me about yourself and your household so that I can compare the views of different people

Are you ? Female □ Male □ Other □ Prefer not to say □

Please indicate the age bracket you are in by ticking the box

Under 20 □	40-49 □	70-79 □
20-29 □	50-59 □	80-89 □
30-39 □	60-69 □	Over 89 □

What is your highest qualification?

No formal qualifications □	Vocational/ NVQ □
GCSE/ O-Level □	Degree or equivalent □
A-Level/ Higher/ BTEC □	Postgraduate qualification □

Other *(please write in)* _____

What is the total number of people who live in your household? (*Please write in)* _____

How many of them are under 18? _____

How many of them are over 65? _____

Do you? (*please tick the appropriate box*)

own your house outright □	rent your house □
have a mortgage □	live rent free □
pay part rent and part mortgage □	other □

Does anyone in your household own or lease a car? (*please tick the appropriate box*)

Yes □ No □

If yes, how many cars are there in the household? *(please write in)* _____

Are you a member of a car club? (*please tick the appropriate box*) Yes □ No □

Please would you indicate your annual household income before tax. *(Please tick the appropriate box)*

up to £10,399 □	£41,600 up to £51,999 □	£80,000 up to 89,999 □
£10,400 up to £20,799 □	£52,000 up to £59,999 □	Above £90,000 □
£20,800 up to £31,199 □	£60,000 up to £69,999 □	
£31,200 up to £41,599 □	£70,000 up to £79,999 □	

Thank You !

Transition Leicester Footpaths Groups

Final Questionnaire

Dear Sir or Madam,

Thank you very much for filling in a questionnaire when you joined your Footpaths group. Now the sessions are finished I am hoping you will help me again by filling out a second questionnaire. The answers to this questionnaire will help me to understand how well the Footpaths programme has worked and how to make it better.

The questionnaire should take 10 to 15 minutes to complete. I am interested in what you think - there are no right or wrong answers. You do not have to answer all of the questions if you prefer not to, but it would be very helpful if you could answer as many as possible. Some questions are the same as the first questionnaire you completed. This is intentional and part of the research approach. All your answers will be kept confidential.

Any information you provide will be handled in compliance with the Data Protection Act 1998. All information will be kept confidential and held securely at De Montfort University.

Thank you very much for your help.

If you have any questions at all please contact me by phone, email or letter.

Yours faithfully,

Jill Fisher
PhD Researcher
Jill Fisher
Institute of Energy and Sustainable Development
De Montfort University
Queens Building Room 1.05
The Gateway
Leicester LE1 9BH

Enquiries to: j.fisher@dmu.ac.uk

0116 255 2551 x 6848

Instructions: *Please read each question in bold and note the instructions given in italics. For some questions you will need to write in a number, for others you will need to circle a number or tick a box. Please could you use the spaces provided in question 12 to list any changes you have made or are planning to make after participating in the Footpaths group.*

1. How would you rate the following aspects of the Footpaths programme

*Please circle **one number** for each*		Not useful	A little useful	Useful	Quite useful	Very useful
a.	Recording energy use	1	2	3	4	5
b.	Making one, two and five year plans	1	2	3	4	5
c.	Doing the homework	1	2	3	4	5
d.	Doing the exercises	1	2	3	4	5
e.	Information from other group members	1	2	3	4	5
f.	Social support from group members	1	2	3	4	5

2. What did you think of the Footpaths Handbook

*Please circle **one number** for each*		Did not like at all	Liked a little	Liked somewhat	Liked quite a lot	Liked a lot
a.	How it looked overall	1	2	3	4	5
b.	Overall content	1	2	3	4	5
c.	Information Sections	1	2	3	4	5
d.	Tips	1	2	3	4	5
e.	Further reading	1	2	3	4	5
f.	Outline of sessions	1	2	3	4	5
g.	Homework pages	1	2	3	4	5

3. Thinking about how the Footpaths group has helped you to make changes, or helped you to plan to make changes in the future, how important have the following factors been

*Please circle **one number** for each*

		Not at all important	Not very important	Fairly important	Very
a.	Given me practical advice on what I can do to reduce my impact	1	2	3	4
b.	Given me information on new products or services so I can take action to reduce my environmental impact	1	2	3	4
c.	Made me believe that what I do actually makes a difference to the environment.	1	2	3	4
d.	Given me facts on how my everyday life impacts on the environment	1	2	3	4
e.	Made me feel more strongly that environmental action is my personal responsibility, not someone else's	1	2	3	4
f.	Made me more confident I can actually do the things that are needed to reduce my impact	1	2	3	4
g.	Shown me examples of what other people are doing to reduce environmental impacts in their own lives	1	2	3	4
h.	Helped me to meet other people like me who are trying to reduce environmental impact in their everyday lives	1	2	3	4
i.	Given me information on where to go for advice/ to get environmentally friendly products	1	2	3	4
j.	Shown me what personal benefits I can get from reducing my environmental impact	1	2	3	4
k.	Shown me what government and business are doing to reduce my environmental impact.	1	2	3	4
l.	Persuaded me that being 'green' is normal	1	2	3	4

4. **Please indicate how <u>frequently</u> you do the following**
*Please **circle one number** for each item*

		Never	Infrequently	Sometimes	Frequently	Always
a.	Boil the kettle with only as much water as you need	1	2	3	4	5
b.	Wash clothes at 40 degrees or less	1	2	3	4	5
c.	Leave the lights on when you are not in the room	1	2	3	4	5
d.	Leave the heating on when you go out for a few hours	1	2	3	4	5
e.	Leave your TV or PC on standby for long periods of time	1	2	3	4	5
f.	Put on warmer clothes indoors instead of turning up the heating	1	2	3	4	5
g.	Wash a load of laundry only when you have a full load	1	2	3	4	5
h.	Take a shower rather than a bath	1	2	3	4	5
i.	Recycle items instead of throwing them away	1	2	3	4	5
j.	Walk or cycle instead of driving for short journeys	1	2	3	4	5
k.	Compost your household's food and/or garden waste	1	2	3	4	5
l.	Reuse items like empty bottles, tubs, jars, envelopes or paper	1	2	3	4	5
m.	Buy fresh locally grown food	1	2	3	4	5
n.	Take public transport instead of driving	1	2	3	4	5

5. **When thinking about <u>taking action</u> to reduce your carbon footprint please indicate how <u>confident</u> you are that you can do each of the things listed below**
*Rate your degree of confidence by **circling one number** for each statement using the scale given below*

0	1	2	3	4	5	6	7	8	9	10
Cannot do at all					**Moderately certain can do**					**Highly certain can do**

a.	Limit your use of electricity	0	1	2	3	4	5	6	7	8	9	10
b.	Use low carbon methods of travel	0	1	2	3	4	5	6	7	8	9	10
c.	Limit the amount you personally throw away	0	1	2	3	4	5	6	7	8	9	10
d.	Reduce the amount of rubbish you produce	0	1	2	3	4	5	6	7	8	9	10
e.	Limit your use of gas	0	1	2	3	4	5	6	7	8	9	10
f.	Restrict the number of non-food items you buy	0	1	2	3	4	5	6	7	8	9	10
g.	Limit the amount of water you personally use	0	1	2	3	4	5	6	7	8	9	10
h.	Choose a diet which is environmentally friendly	0	1	2	3	4	5	6	7	8	9	10
i.	Involve others in engaging with carbon reduction	0	1	2	3	4	5	6	7	8	9	10
j.	Help groups to work well together	0	1	2	3	4	5	6	7	8	9	10

6. When thinking about <u>taking action</u> to reduce your carbon footprint please indicate how much you <u>agree</u> with the following statements

*Please **circle one number** for each statement*

		Strongly Disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
a.	I am not sure what changes it would be possible for me to make to reduce my carbon footprint	1	2	3	4	5
b.	I believe I have a responsibility to reduce my carbon footprint	1	2	3	4	5
c.	I feel overwhelmed when I think about changing the way I live	1	2	3	4	5
d.	I can imagine what my life would be like if I reduced my carbon footprint	1	2	3	4	5
e.	Trying to take action to reduce my carbon footprint is frustrating	1	2	3	4	5
f.	I have a clear idea about what actions to take	1	2	3	4	5
g.	I feel helpless when I think about reducing my carbon footprint	1	2	3	4	5
h.	My actions can make a difference to climate change	1	2	3	4	5
i.	It is difficult to understand how to apply information about reducing my carbon footprint to my daily life	1	2	3	4	5

7. For each of the statements listed below, please think about <u>how frequently</u> you have each experience in your everyday life

*Please **circle one number** for each item to indicate how **frequently** you have each experience*

		Almost Never	Very Infrequently	Infrequently	Frequently	Very Frequently	Almost Always
a.	I could be experiencing some emotion and not be conscious of it until some time later	1	2	3	4	5	6
b.	I break or spill things because of carelessness, not paying attention, or thinking of something else	1	2	3	4	5	6
c.	I find it difficult to stay focused on what is happening in the present	1	2	3	4	5	6
d.	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	1	2	3	4	5	6
e.	I tend not to notice feelings of physical tension or discomfort until they really grab my attention	1	2	3	4	5	6
f.	I forget a person's name almost as soon as I've been told it for the first time	1	2	3	4	5	6
g.	It seems I am "running on automatic" without much awareness of what I'm doing	1	2	3	4	5	6
h.	I rush through activities without being really attentive to them	1	2	3	4	5	6
i.	I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there	1	2	3	4	5	6
j.	I do jobs or tasks automatically, without being aware of what I'm doing	1	2	3	4	5	6
k.	I find myself listening to someone with one ear, doing something else at the same time	1	2	3	4	5	6
l.	I drive places on "automatic pilot" and then wonder why I went there	1	2	3	4	5	6
m.	I find myself preoccupied with the future or the past	1	2	3	4	5	6
n.	I find myself doing things without paying attention	1	2	3	4	5	6
o.	I snack without being aware that I'm eating	1	2	3	4	5	6

8. Please indicate how <u>difficult</u> you find it to do the following things

*Please **circle one number** for each action*		Very difficult	Quite difficult	Not very difficult	Quite easy	Very easy	Already doing this
a.	Use less gas and electricity	1	2	3	4	5	6
b.	Replace appliances with energy efficient alternatives	1	2	3	4	5	6
c.	Replace light blubs with energy efficient ones	1	2	3	4	5	6
d.	Sign up to a green energy tariff	1	2	3	4	5	6
e.	Turn the heat on less often and/or at a lower temperature	1	2	3	4	5	6
f.	Install insulation	1	2	3	4	5	6
g.	Turn off lights when leaving a room	1	2	3	4	5	6
h.	Turn off/unplug electric goods that are not in use	1	2	3	4	5	6
i.	Drive less	1	2	3	4	5	6
j.	Cycle more	1	2	3	4	5	6
k.	Use more public transport	1	2	3	4	5	6
l.	Avoid travelling by plane	1	2	3	4	5	6
m.	Make weekend trips and holidays closer to home	1	2	3	4	5	6
n.	Eat less meat	1	2	3	4	5	6
o.	Eat more organic products	1	2	3	4	5	6
p.	Eat more locally produced food	1	2	3	4	5	6
q.	Eat more seasonal produce	1	2	3	4	5	6
r.	Produce less waste	1	2	3	4	5	6
s.	Use less water	1	2	3	4	5	6
t.	Buy fewer non-food items	1	2	3	4	5	6

9. Please select the <u>three actions</u> you think would <u>make the biggest difference</u> to the carbon footprint of the average household in the UK

*Please **circle the letter** next to each of the **three** categories you think would make the biggest difference*

a Adopt a vegetarian diet

b Install insulation

c Install renewable energy

d Limit water use

e Reduce short haul flights

f Use car less

g Waste less food

10. Please indicate how <u>important</u> you think the role of the following is in tackling climate change

*Please circle **one number** for each*		**Not at all important**	**A little important**	**Somewhat important**	**Quite important**	**Very important**
a.	Government	1	2	3	4	5
b.	Business and Industry	1	2	3	4	5
c.	Communities	1	2	3	4	5
d.	Individuals	1	2	3	4	5

11. How much <u>responsibility</u> do you think the following should take for tackling climate change

*Please circle **one number** for each*		**None**	**A little**	**Some**	**A lot**	**All**
a.	Government	1	2	3	4	5
b.	Business and Industry	1	2	3	4	5
c.	Communities	1	2	3	4	5
d.	Individuals	1	2	3	4	5

10. Having taken part in a Footpaths group, which statement best describes what you are doing now

*Please **circle the letter** next to **one** statement*

a I am now doing much more than before to reduce my carbon footprint

b I am now doing a bit more than before to reduce my carbon footprint

c I am not yet doing more to reduce my carbon footprint but I intend to do more in the future

d I have not taken action to reduce my carbon footprint and do not intend to do so

If you are doing more to reduce your carbon footprint, please could you list what you are doing:

If you intend to do more to reduce your carbon footprint, please could you list what you plan to do:

Please could you fill in the $kgCO_2$ produced by your household from home energy use Please give <u>household totals</u> for each category – see page 27 in the handbook	**Gas**	**Electric**	**Other**
Please could you fill in the $kgCO_2$ produced <u>per person</u> from transport energy use – see page 66 in the handbook	**Car/private vehicles total**	**Flying**	**Other public transport**

What is the total number of people who live in your household? (*Please write in)* _____

How many of them are under 18? _____

How many of them are over 65? _____

Do you? (*please tick the appropriate box*)

own your house outright □ rent your house □

have a mortgage □ live rent free □

pay part rent and part mortgage □ other □

Does anyone in your household own or lease a car? (*please tick the appropriate box*)

Yes □ No □

If yes, how many cars are there in the household? *(please write in)* _____

Are you a member of a car club? (*please tick the appropriate box*) Yes □ No □

Please would you indicate your annual household income before tax. *(Please tick the appropriate box)*

up to £10,399	□	£41,600 up to £51,999	□	£80,000 up to 89,999	□
£10,400 up to £20,799	□	£52,000 up to £59,999	□	Above £90,000	□
£20,800 up to £31,199	□	£60,000 up to £69,999	□		
£31,200 up to £41,599	□	£70,000 up to £79,999	□		

Thank You !

Transition Leicester Footpaths Groups

Follow Up Questionnaire

Dear Sir or Madam,

Thank you very much for filling in questionnaires at the start and end of your Footpaths group sessions. Now that it has been a year since your group started, I am hoping you will help me again by filling out a final questionnaire. The answers to this questionnaire will help me to understand how well the Footpaths programme has worked.

The questionnaire should take 10 to 15 minutes to complete. I am interested in what you think - there are no right or wrong answers. You do not have to answer all of the questions if you prefer not to, but it would be very helpful if you could answer as many as possible. Some of the questions are the same as in the other questionnaires you completed. This is intentional and part of the research approach. All your answers will be kept confidential.

Any information you provide will be handled in compliance with the Data Protection Act 1998. All information will be kept confidential and held securely at De Montfort University.

Thank you very much for your help.

If you have any questions at all please contact me by phone, email or letter.

Yours faithfully,

Jill Fisher

PhD Researcher

Jill Fisher
Institute of Energy and Sustainable Development
De Montfort University
Queens Building Room 1.05
The Gateway
Leicester LE1 9BH

Enquires to: j.fisher@dmu.ac.uk

0116 255 2551 x 6848

Instructions: *Please read each question in bold and note the instructions given in italics. For some questions you will need to write in a number, for others you will need to circle a number or tick a box. Please could you use the spaces provided in question 12 to list any changes you have made or are planning to make after participating in the Footpaths group.*

1. Please indicate how frequently you do the following

Please circle one number for each item

	Never	Infrequently	Sometimes	Frequently	Always
Boil the kettle with only as much water as you need	1	2	3	4	5
Wash clothes at 40 degrees or less	1	2	3	4	5
Leave the lights on when you are not in the room	1	2	3	4	5
Leave the heating on when you go out for a few hours	1	2	3	4	5
Leave your TV or PC on standby for long periods of time	1	2	3	4	5
Put on warmer clothes indoors instead of turning up the heating	1	2	3	4	5
Wash a load of laundry only when you have a full load	1	2	3	4	5
Take a shower rather than a bath	1	2	3	4	5
Recycle items instead of throwing them away	1	2	3	4	5
Walk or cycle instead of driving for short journeys	1	2	3	4	5
Compost your household's food and/or garden waste	1	2	3	4	5
Reuse items like empty bottles, tubs, jars, envelopes or paper	1	2	3	4	5
Buy fresh locally grown food	1	2	3	4	5
Take public transport instead of driving	1	2	3	4	5

2. When thinking about taking action to reduce your carbon footprint please indicate how confident you are that you can do each of the things listed below

*Rate your degree of confidence by **circling one number** for each statement using the scale given below*

0	1	2	3	4	5	6	7	8	9	10
Cannot do at all				**Moderately certain can do**					**Highly certain can do**	

Limit your use of electricity	0	1	2	3	4	5	6	7	8	9	10
Use low carbon methods of travel	0	1	2	3	4	5	6	7	8	9	10
Limit the amount you personally throw away	0	1	2	3	4	5	6	7	8	9	10
Reduce the amount of rubbish you produce	0	1	2	3	4	5	6	7	8	9	10
Limit your use of gas	0	1	2	3	4	5	6	7	8	9	10
Restrict the number of non-food items you buy	0	1	2	3	4	5	6	7	8	9	10
Limit the amount of water you personally use	0	1	2	3	4	5	6	7	8	9	10
Choose a diet which is environmentally friendly	0	1	2	3	4	5	6	7	8	9	10
Involve others in engaging with carbon reduction	0	1	2	3	4	5	6	7	8	9	10
Help groups to work well together	0	1	2	3	4	5	6	7	8	9	10

3. When thinking about taking action to reduce your carbon footprint please indicate how much you agree with the following statements

*Please **circle one number** for each statement*

	Strongly Disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
I am not sure what changes it would be possible for me to make to reduce my carbon footprint	1	2	3	4	5
I believe I have a responsibility to reduce my carbon footprint	1	2	3	4	5
I feel overwhelmed when I think about changing the way I live	1	2	3	4	5
I can imagine what my life would be like if I reduced my carbon footprint	1	2	3	4	5
Trying to take action to reduce my carbon footprint is frustrating	1	2	3	4	5
I have a clear idea about what actions to take	1	2	3	4	5
I feel helpless when I think about reducing my carbon footprint	1	2	3	4	5
My actions can make a difference to climate change	1	2	3	4	5
It is difficult to understand how to apply information about reducing my carbon footprint to my daily life	1	2	3	4	5

4. For each of the statements listed below, please think about how frequently you have each experience in your everyday life

Please circle one number for each item to indicate how frequently you have each experience

	Almost Never	Very Infrequently	Infrequently	Frequently	Very Frequently	Almost Always
I could be experiencing some emotion and not be conscious of it until some time later	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else	1	2	3	4	5	6
I find it difficult to stay focused on what is happening in the present	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time	1	2	3	4	5	6
It seems I am "running on automatic" without much awareness of what I'm doing	1	2	3	4	5	6
I rush through activities without being really attentive to them	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time	1	2	3	4	5	6
I drive places on "automatic pilot" and then wonder why I went there	1	2	3	4	5	6
I find myself preoccupied with the future or the past	1	2	3	4	5	6
I find myself doing things without paying attention	1	2	3	4	5	6
I snack without being aware that I'm eating	1	2	3	4	5	6

5. **Please indicate how difficult you find it to do the following things**

*Please **circle one number** for each action*	Very difficult	Quite difficult	Not very difficult	Quite easy	Very easy	Already doing this
Use less gas and electricity	1	2	3	4	5	6
Replace appliances with energy efficient alternatives	1	2	3	4	5	6
Replace light blubs with energy efficient ones	1	2	3	4	5	6
Sign up to a green energy tariff	1	2	3	4	5	6
Turn the heat on less often and/or at a lower temperature	1	2	3	4	5	6
Install insulation	1	2	3	4	5	6
Turn off lights when leaving a room	1	2	3	4	5	6
Turn off/unplug electric goods that are not in use	1	2	3	4	5	6
Drive less	1	2	3	4	5	6
Cycle more	1	2	3	4	5	6
Use more public transport	1	2	3	4	5	6
Avoid travelling by plane	1	2	3	4	5	6
Make weekend trips and holidays closer to home	1	2	3	4	5	6
Eat less meat	1	2	3	4	5	6
Eat more organic products	1	2	3	4	5	6
Eat more locally produced food	1	2	3	4	5	6
Eat more seasonal produce	1	2	3	4	5	6
Produce less waste	1	2	3	4	5	6
Use less water	1	2	3	4	5	6
Buy fewer non-food items	1	2	3	4	5	6

6. **Here are some typical statements about climate change and the impact of our daily lives on the environment. Please indicate which one is closest to how you think and feel**

*Please **circle the letter** next to **one** of the statements below*

a I don't know much about climate change. I can't afford a car so I use public transport.

b 'Waste not, want not' that's important. You should live life thinking about what you're doing and using

c I think I do more than a lot of people. Still, going away is important, I'd find that hard to give up.

d Maybe there'll be an environmental disaster, maybe not. Makes no difference to me, I'm just living my life the way I want to.

e I do a couple of things to help the environment. I'd really like to do more as long as others were.

f I think it's important that I do as much as I can to limit my impact on the environment.

g I think climate change is a big problem for us. I suppose I don't think much about how much water or electricity I use, and I forget to turn things off… I'd like to do a bit more.

7.

How much <u>responsibility</u> do you think the following should take for tackling climate change

*Please circle **one number** for each*	**None**	**A little**	**Some**	**A lot**	**All**
Government	1	2	3	4	5
Business and Industry	1	2	3	4	5
Communities	1	2	3	4	5
Individuals	1	2	3	4	5

8. Please indicate how important you think the role of the following is in tackling climate change

*Please circle **one number** for each*	**Not at all important**	**A little important**	**Somewhat important**	**Quite important**	**Very important**
Government	1	2	3	4	5
Business and Industry	1	2	3	4	5
Communities	1	2	3	4	5
Individuals	1	2	3	4	5

9. Please indicate how much you agree with the following statements

*Please **circle one number** for each statement*	**Strongly Disagree**	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
We are approaching the limit of the number of people the earth can support	1	2	3	4	5
Humans have the right to modify the natural environment to suit their needs	1	2	3	4	5
When humans interfere with nature it often produces disastrous consequences	1	2	3	4	5
Human ingenuity will insure that we do NOT make the earth unliveable	1	2	3	4	5
Humans are severely abusing the environment	1	2	3	4	5
The earth has plenty of natural resources if we just learn how to develop them	1	2	3	4	5
Plants and animals have as much right as humans to exist	1	2	3	4	5
The balance of nature is strong enough to cope with the impacts of modern industrial nations	1	2	3	4	5
Despite our special abilities humans are still subject to the laws of nature	1	2	3	4	5
The so called “ecological crisis” facing humankind has been greatly exaggerated	1	2	3	4	5
The earth is like a spaceship with very limited room and resources	1	2	3	4	5
Humans were meant to rule over the rest of nature	1	2	3	4	5
The balance of nature is very delicate and easily upset	1	2	3	4	5
Humans will eventually learn enough about how nature works to be able to control it	1	2	3	4	5
If things continue on their present course, we will soon experience a major ecological catastrophe	1	2	3	4	5

11. Comparing what you are doing now with what you were doing when your Footpaths group finished, which statement best describes what you are doing?

*Please **circle the letter** next to **one** statement*

e I am now doing much more than before to reduce my carbon footprint

f I am now doing a bit more than before to reduce my carbon footprint

g I am not yet doing more to reduce my carbon footprint but I intend to do more in the future

h I have not taken action to reduce my carbon footprint and do not intend to do so

If you are doing more to reduce your carbon footprint, please could you list what you are doing:

If you intend to do more to reduce your carbon footprint, please could you list what you plan to do:

Please could you work out your home energy use for the last 12 months for your household by subtracting your very first meter reading from your current meter reading or by looking at your bills if you do not have meter readings. Choose the units for gas and electricity which correspond to your meter readings or bill. (See the home energy pages in the Footpaths Handbook for help)

Gas	cubic metres	Heating Oil	litres
Gas	100's of cubic feet	Bottled Gas – red bottles	kg
Gas	kilowatt hours	Bottled Gas – blue bottles	kg
Electricity	kilowatt hours	Coal – anthracite	kg
Green electricity	kilowatt hours	Coal – bituminous	kg
		Wood	kg

Please could you work out your travel mileage for the last 12 months for you <u>personally.</u> To do this please divide the miles travelled by car by the average number of people in the car. (See the transport pages in the Footpaths handbook for help)			
Petrol car – up to 1.4 litre engine	miles	Local bus	miles
Petrol car – 1.4 to 2.1 litre engine	miles	Coach	miles
Petrol car – over 2.1 litre	miles	Rail	miles
Diesel car – up to 2.0 litre engine	miles	Eurostar	miles
Diesel car – over 2 litre engine	miles	Ferry	miles
LPG car	miles	Long haul flight business class	miles
Motorcyle	miles	Long haul flight economy class	miles
Hybrid car	miles	Short haul flight	miles
	miles	Domestic flight	miles

Would you like your name to be put on an email list of people who've taken part in Footpaths to be sent occasional information about events and offers (for example our detailed food day event, an evening to discuss dry lining, cheap solar panels, shares in an apple press)? If so, please tick here ☐

What is the total number of people who live in your household? (*Please write in)* _____

How many of them are under 18? _____

How many of them are over 65? _____

Do you? (*please tick the appropriate box*)

own your house outright □ rent your house □

have a mortgage □ live rent free □

pay part rent and part mortgage □ other □

Does anyone in your household own or lease a car? (*please tick the appropriate box*)

Yes □ No □

If yes, how many cars are there in the household? *(please write in)* _____

Are you a member of a car club? (*please tick the appropriate box*) Yes □ No □

Please would you indicate your annual household income before tax. *(Please tick the appropriate box)*

up to £10,399	□	£41,600 up to £51,999	□	£80,000 up to 89,999	□
£10,400 up to £20,799	□	£52,000 up to £59,999	□	Above £90,000	□
£20,800 up to £31,199	□	£60,000 up to £69,999	□		
£31,200 up to £41,599	□	£70,000 up to £79,999	□		

Thank You !

Appendix 4 Carbon footprint Forms

Footpaths - Community Carbon Reduction – a carbon footprint estimate

Name:…….....
Address:.....
Email:…….....

1. **What kind of house do you live in?**
   Flat or maisonette / Mid-terrace /
   / Semi-detached or end-terrace / Detached
2. **How many rooms does your house have, not including bathrooms or store-rooms** (UK average is 5.34)
   1 - 2 / 3 - 4 / 5 - 6 / 7 - 8 / 9 - 10 / 11 or more
3. **How many people over 5 years old live in your house?**
   If variable, estimate an average level (UK average is 2.4)
   One / Two / Three / Four / Five / Six / Seven or more
4. **What fuel is used for heating the house?**
   Mains gas / Bottled gas / Oil / Coal / Electricity / Wood /
   / Green tariff electricity
5. **Choose the closest description of your house**
   - Over 10 years old, no energy efficiency improvements
   - Over 10 years old, with some insulation or double glazing
   - Over 10 years old, with extra insulation of walls, thermal glazing and draught-proofing
   - Less than 10 years old
   - Less than 10 years old with further improvements in insulation
   - Designed super-insulated eco-house
6. **How warm do you like to keep the house?**

Very cool	Below 18º	woolly jumper
Cool	19º-20º	light jumper
Warm	21º	shirtsleeves/socks
Very warm	Over 21º	t shirts/pyjamas/no socks

7. **Do you keep some parts of the house warmer than others?**
   No, it's all the same temperature /
   Yes, the living rooms are warmer /
   Any other arrangement
8. **During the winter, is the heating on all the time?**
   Yes / No, it's off at night / No, it's off when everyone's out / No, it's off both at night and when everyone's out
   / Any other arrangement
9. **How often do you take a shower?**
   Once daily / More than once daily / Less than once daily /Never
10. **Do you have a power shower? -** Yes / No
11. **How often do you take a bath?**
    Once daily or more / Less than once daily / Never
12. **Do you have solar water heating? -** No / Yes
13. **Do you buy electricity from a 'green' supplier like 'good energy'? -** Yes / No
14. **Do you have any low energy lights instead of normal light-bulbs? -** All / Some / None
15. **What cold appliances do you have?**
    Fridge only / Combined fridge-freezer /
    / Separate fridge and freezer / None
16. Do you use a tumble-drier regularly? - Yes / No
17. How many cars does your household own?
    None / One / Two / More than two
18. **What is the size of the car you usually travel in?**
    Less than 1.2 litres / 1.3 to 1.9 litres / More than 2 litres
19. **How much car travel do you do most days? (Include commuting and taxi journeys but not travel for work)**
    Hardly any / Up to 1 hour / Up to 2 hours / More than 2 hours
20. **What is the usual number of car occupants including the driver? -** One / Two / Three / Four or more
21. **How many long trips over 80miles do you take by car each year? -** 0 / 1 - 2 / 2 - 5 / More than 5
22. **What is the usual number of car occupants for these trips, including the driver? –** 1 / 2 / 3 / 4 or more
23. **Do you regularly use a bicycle or walk for short trips? -** Yes / No
24. **How far do you usually travel by bus or train every week?** (Include commuting but not journeys for work)
    Less than 20 km / 20-100 km / More than 100 km
25. **How many long-distance journeys (80 miles +) do you take by bus, coach or train each year?**
    None / 1 to 3 / More than 3
26. **How many air flights have you made in the last year?**
    Count the number of return flights or legs of longer journeys. (Exclude trips made solely for work.) Leave blank if no flights.

a) 1 hour or less	
b) 1-2 hours	
c) 3-4 hours	
d) 5-11 hours	
e) 12 hours or more	

27. **How often do you eat meat or fish?**
    Most meals / Once a day / Occasionally / Never
28. **How often do you eat milk products, cheese or eggs?**
    Every day / Occasionally / Never
29. **Are most of your meals:**
    Made fresh from raw ingredients /
    Made fresh from a mix of raw and processed ingredients/
    Made largely of processed ingredients/
    Bought ready-prepared
30. **Do you know where your food comes from?**
    - Almost all the food I buy has been produced within 30 miles of where I live
    - Almost all the food I buy is local or from the UK
    - I buy a mix of local, UK and imported food
    - I buy almost everything from the supermarket
31. **How much of your food is organic? -** Most / Some / None
32. **Is your food waste composted? -** Yes / No
33. **Other consumption: please select your income bracket.**
    Under £10,000 / £10 – 19,999 / £20 – 29, 999 / £30 – 39, 999 / / £40 – 49, 999 / £50,000 and above /
    / Don't know / Don't want to say

This question lets us estimate the CO_2 in the rest of your activity where carbon emissions are roughly proportional to income. If you'd rather not answer this question the program makes an estimate based on your answers to other questions.

Please return as soon as possible in the stamped addressed envelope provided

Appendix 5 Summary of principal statistical tests used and the reason for using the test in this study (Field 2009)

Statistical test	Measures	Reason for test
Skewness and kurtosis Shapiro-Wilk test	Normality of the distribution of the data	Some statistical tests are only suitable for normally distributed data. Measures of skewness and kurtosis indicate whether data are normally distributed. The Shapiro-Wilk test gives a further indication of whether or not the data are normally distributed.
Principal axis factoring	A method of reducing a larger number of variables to a smaller number of variables.	Used to explore whether the scales developed by the researcher should be treated as one or more variables in subsequent analyses.
Cronbach's alpha	The internal consistency of a scale	Provides an indication of whether the questions in a scale are addressing the same underlying construct. If they are, then the scale items can averaged to provide a single variable for further analysis. Testing scale reliability is important for previously untested scales.
Wilcoxon Signed ranks	The difference between repeated measurements on the same sample when the data are not normally distributed.	Determines whether there are statistically significant differences in the same variable at different times when the data are not normally distributed.
Paired t-test	The difference between repeated measurements on the same sample when the data are normally distributed.	Determines whether there are statistically significant differences in the same variable at different times when the data are normally distributed.
Kendall's Tau	The association between two variables when the data are not normally distributed	Determines whether there is a statistically significant relationship between two variables when the data are not normally distributed
Pearson's r	Measures the linear correlation between two variables	Determines whether there is a statistically significant relationship between two variables when the data are normally distributed.

Appendix 6 Correlation Matrix for Socio-demographic Data

	Gender	Age	Qualifications	Household Number	Under18	Over65	Tenure	Household Income	Carbon Footprint Change T1T2	Carbon Footprint Change T2T3	Carbon Footprint Change T1T3	Pro-environmental Behaviour Change T1T2	Pro-environmental Behaviour Change T2T3	Pro-environmental Behaviour Change T1T3
Gender	1.000	**.211***	-.194	-.068	-.093	.054	-.044	-.101	-.190	.124	-.128	-.083	-.062	.125
Age	*88*	1.000	-.020	**-.236****	**-.236****	**.459****	**-.439****	-.046	-.134	-.019	-.203	-.153	-.047	.010
Qualifications	*88*	*88*	1.000	.020	.038	-.083	-.150	**.358****	.092	.259	**.297***	-.084	.219	**-.321***
Household Number	*88*	*88*	*88*	1.000	**.686****	**-.252****	-.002	**.325****	-.040	-.059	-.088	-.088	-.174	.064
Under18	*88*	*88*	*88*	*88*	1.000	**-.242***	-.027	**.268****	.012	-.021	-.024	-.027	-.101	.054
Over65	*88*	*88*	*88*	*88*	88	1.000	**-.239***	**-.204***	-.057	-.148	-.103	-.094	.117	-.287
Tenure	*88*	*88*	*88*	*88*	*88*	*88*	1.000	**-.190***	.054	-.128	-.090	.005	-.193	**.300***
Household Income	*81*	*81*	*81*	*81*	*81*	*81*	81	1.000	.066	.015	.107	-.040	.088	-.245
Carbon Footprint Change T1T2	*59*	*59*	*59*	*59*	59	59	59	54	1.000	.106	**.426****	.130	.297*	-.084
Carbon Footprint Change T2T3	*27*	*27*	*27*	*27*	27	27	27	*25*	*27*	1.000	**.681****	.301*	.111	.188
Carbon Footprint Change T1T3	*29*	*29*	*29*	*29*	29	29	29	*27*	*27*	*27*	1.000	**.366****	.239	.030
Pro-environmental Behaviour Change T1T2	*59*	*59*	*59*	*59*	59	59	59	*54*	*56*	*27*	*29*	1.000	**.422****	**.251***
Pro-environmental Behaviour Change T2T3	*31*	*31*	*31*	*31*	31	31	31	*29*	*29*	*27*	*29*	*31*	*31*	*31*
Pro-environmental Behaviour Change T1T3	*31*	*31*	*31*	*31*	31	31	31	*29*	*29*	*27*	*29*	*31*	1.000	**-.348****

Figures in italics represent sample size for each test

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

Appendix 7 Participant Observer Consent Form

7th October 2010

Dear Sir or Madam,

I am hoping that you will be willing to participate in a study about the Transition Leicester Footpaths groups. If you are happy to be involved please would you sign the consent form on the back of this letter. There are two copies of this letter and form so that you can keep one for your records. Please would you return one signed copy of the form to me with the initial questionnaire and your quick carbon footprint form in the prepaid envelope provided.

What is the purpose of the Study? The study seeks to understand how the Footpaths groups work and how people feel about participating in the groups.

What does the study involve? The study will consist of a questionnaire for you to complete before the first group session, a questionnaire for you to complete after the final session, and a questionnaire for you to complete a year after the sessions begin. In addition, I would like to contact you to ask whether you are happy for me to interview you about your experience. I would also like to use the carbon footprint and energy use information you provide.

Who is carrying out the study? The study is being carried out by Jill Fisher from the Institute of Energy and Sustainable Development (IESD) at De Montfort University as part of a PhD and is being supervised by Dr Katherine Irvine and Dr Andrew Reeves from the Institute. The research is funded by the IESD and is supported by the Transition Leicester Footpaths Project.

How will the results be used? The data from this study will be analysed and used in a PhD thesis, academic papers and conference presentations, and in a summary report for the Transition Leicester Footpaths project. Neither your name nor any other personal identifying information will appear in the final thesis or any reports, papers or conference presentations resulting from this study. Anonymous data will be made available to the Transition Leicester Footpaths project to assist them in assessing and improving the project.

What will happen to information you provide? All data collected and processed in this study will be handled in compliance with the Data Protection Act 1998. All information will be anonymised and stored in a secure location.

Participation in this study is entirely voluntary. You may decide not to answer any of the questions if you wish. You may also decide to withdraw from this study at any time. I may ask for clarification of some points, but you are not obliged to clarify or participate further. Beyond that I will not seek any more information or make any further contact with you after the study finishes unless you ask me to.

I can assure you that this study has been reviewed and approved by my supervisors and the De Montfort University Human Research Ethics committee. If you have any questions regarding this study or would like any additional information please do not hesitate to contact me or my supervisors (see below).

If you have any queries specifically about Data Protection Issues you may contact Fraser Marshall, Records Manager, Kimberlin Library, De Montfort University, The Gateway, Leicester LE1 9BH, UK Tel: 0116 257 7655, email: fmarshall@dmu.ac.uk.

Thank you for your assistance in this study.

Yours Sincerely,

Jill Fisher

Jill Fisher	Tel: 0116 255 2551 x 6848:	email: j.fisher@dmu.ac.uk
Dr Katherine Irvine	Tel: 0116 207 8711	email: kirvine@dmu.ac.uk
Dr Andrew Reeves	Tel: 0116 2689718	email: areeves@ruralcc.org.uk

Evaluation Study of Transition Leicester Carbon Reduction Project

Agreement for the researcher to observe all sessions of the Quaker Meeting Footpath Group

I have read the information presented in the letter about research being conducted by Jill Fisher for her PhD thesis at De Montfort University.

I have had the opportunity to ask any questions related to this study, and where applicable I have received satisfactory answers to my questions, and any additional details I wanted.

I am also aware that information that I provide may be included in the final thesis resulting from this research, in academic publications and presentations, and in a summary report for the Transition Leicester Carbon Reduction Project.

I understand that I am free to withdraw my participation at any time.

I understand that participation in this research is confidential and that my name will not be used in connection with the results in any way.

With full knowledge of all foregoing, I agree to Jill Fisher observing all the sessions of the Quaker Meeting Footpath group and using findings from this observation as part of the research project described overleaf.

Participant Name: _____

Participant Signature: _____

Date: _____

Appendix 8 Interview Schedule for Footpaths Evaluation

INTRODUCTION

- Thank you for taking the time to be interviewed.

- The information I'm collecting from this interview will be used to help understand and improve the Footpaths programme and is part of research I am doing at DeMontfort University as part of a PhD.

- Before we start please can I just ask you read this form and sign it if you are happy to be interviewed.

- I would like to record the interview to help me remember what we talk about. Your name will not be on the recording. Is that OK?

- This is an informal interview and should only take 30 to 40 minutes.

- Please feel free to leave at any time, or to ask me to leave if you don't want to continue. You don't need to give me an explanation.

- This interview is designed to find out more about your experience of the Footpaths group. There are no wrong or right answers. I just want to find out about what being in a Footpaths group was like for you.

- It would be great if your answers could be as frank and complete as possible – no-one other than me will know who said what.

- I have a list of topics I would like to try to cover, but I'm also interested in anything you think is important or that comes up as we go along.

- Do you want to ask me anything before we start?

INTERVIEW QUESTIONS

1. How did you end up joining a Footpaths group?

2. What did you think you would get from going to the group?
    a. Did you get what you wanted?
    b. Did you get other things?

3. Thinking about before you joined the group, how much did you think it was your responsibility to reduce your carbon footprint?

4. And now, how much do you think it is your responsibility to reduce your footprint? Has it changed? Why do you think it's changed?

5. Again, before you joined the group, and thinking about how to reduce your carbon footprint what did you think about the information you had
    a. Was it easy to understand?
    b. How about applying it to your life?

6. Having done the group, what do you think about the information you now have about how to reduce your carbon footprint?
    a. Is it easy to understand?
    b. How about applying it to your life?

7. Before the group, how did you feel about reducing your carbon footprint – on an emotional level?
    a. Positive or negative?

8. And on an emotional level – how do you feel now about reducing your carbon footprint?

9. Overall, thinking about the effect of being in the group :
    a. Do you think you know more about the environmental impact of your life? How did the group help?
    b. Do you feel more confident about reducing your carbon footprint? Why?
    c. Are you making changes as a result of being in the group? How has the group helped?

10. Thinking about the group,
    a. What were your favourite things about the group
    b. What were your least favourite things

11. I'd like you to think what about being in the Footpaths group influenced you in changing how you think or what you are doing, and write each one on one of these bits of paper. Write down whatever occurs to you, and as many as you want. It might help to imagine that you are telling a friend about them.

12. Thank you – now could you try and order them with the most important first.

13. Do you feel that your group worked well as a group?
    a. What do you think contributed to this?
    b. There were some exercises on role, scapegoating and rank, which were designed to help the group work well
        i. Do you remember them
        ii. How did you feel about them
        iii. Have they been useful to you in other situations

14. What conflicts or difficulties have you experienced either within yourself or with others as a result of learning things within the group?
    a. Has being in the group helped you to deal with them?

15. So, finally, would you recommend Footpaths groups to a friend? Why?

Before we finish is there anything I've not asked about that you think I might be interested in?

Do you have any questions you have for me?

Thank you very much for your time, it's been really helpful

Appendix 9 Interview Consent Form

Dear Sir/Madam,

I am hoping that you will be willing to participate in a study about the Transition Leicester Carbon Reduction Groups. If you are happy to be involved please would you sign the consent form on the back of this letter.

What is the purpose of the Study? The study seeks to understand how the Transition Leicester Carbon Reduction Groups work and how people feel about participating in the groups.

What does the study involve? The study will consist of a questionnaire to be filled out before the first group session, a questionnaire to be filled out after the final session, and a questionnaire to be filled out a year after the sessions begin. In addition I would like to contact you to ask whether you are happy for me to interview you about your experience. I would also like to use the carbon footprint and energy use information you provide during the group.

Who is carrying out the study? The study is being carried out by Jill Fisher from the Institute of Energy and Sustainable Development (IESD) at De Montfort University as part of a PhD and is being supervised by Dr Katherine Irvine, Dr Greig Mill and Dr Andrew Reeves from the Institute. The research is funded by the IESD and is supported by the Transition Leicester Carbon Reduction Project.

How will the results be used? The data from this study will be analysed and used in a PhD thesis, academic papers and conference presentations, and in a summary report for the Transition Leicester Carbon Reduction Project. Your name or any other personal identifying information will not appear in the final thesis or any reports, papers or conference presentations resulting from this study. Anonymised data will be made available to the Transition Leicester Carbon Reduction Project to assist them in assessing and improving the project.

What will happen to information you provide? All data collected and processed in this study will be handled in compliance with the Data Protection Act 1998. All information will be anonymised and stored in a secure location.

Participation in this study is entirely voluntary. You may decide not to answer any of the questions if you wish. You may also decide to withdraw from this study at any time. I may ask for clarification of some points, but you will not be obliged in any way to clarify or participate further. Beyond that I will not seek any more information or make any further contact with you after the study finishes unless you ask me to.

I can assure you that this study has been reviewed and approved by my supervisors and the De Montfort University Human Research Ethics committee. If you have any questions regarding this study or would like any additional information please do not hesitate to contact me or my supervisors (see below). If you have any queries specifically about Data Protection Issues you may contact Fraser Marshall, Records Manager, Kimberlin Library, De Montfort University, The Gateway, Leicester LE1 9BH, UK Tel: 0116 257 7655, email: fmarshall@dmu.ac.uk.

Thank you for your assistance in this study.

Yours Sincerely,

Jill Fisher

Jill Fisher	Tel: 0116 255 2551 x 6848:	email: j.fisher@dmu.ac.uk
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Evaluation Study of Transition Leicester Carbon Reduction Project

Agreement to be Interviewed

I have read the information presented in the letter about research being conducted by Jill Fisher for her PhD thesis at De Montfort University.

I have had the opportunity to ask any questions related to this study, and where applicable I have received satisfactory answers to my questions, and any additional details I wanted.

I am also aware that information that I provide may be included in the final thesis resulting from this research, in academic publications and presentations, and in a summary report for the Transition Leicester Carbon Reduction Project.

I understand that I am free to withdraw my participation at any time.

I understand that participation in this research is confidential and that my name will not be used in connection with the results in any way.

With full knowledge of all foregoing, I agree to be interviewed by Jill Fisher and for the results of the interview to be included in the study described overleaf.

Participant Name: _____

Participant Signature: _____

Date: _____